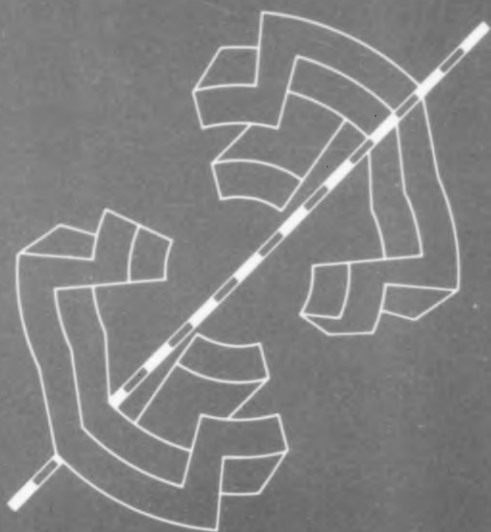


ISSN 0012-365X

# DISCRETE MATHEMATICS



MASTER INDEX  
VOLUMES 111-120

NORTH-HOLLAND

# DISCRETE MATHEMATICS

**Editor-in-Chief** Peter L. Hammer, New Brunswick (NJ)

## Advisory Editors

C. Berge, Paris  
P. Erdős, Budapest  
B. Grünbaum, Seattle (WA)  
M.A. Harrison, Berkeley (CA)

A.J. Hoffman,  
Yorktown Heights (NY)  
V.L. Klee, Seattle (WA)  
J.H. van Lint, Eindhoven

R.C. Mullin, Waterloo  
G.-C. Rota, Cambridge (MA)  
V.T. Sós-Turán, Budapest

## Board of Editors

M.S. Aigner, Berlin  
B. Alspach, Burnaby  
G.E. Andrews, Univ. Park (PA)  
A. Barlotti, Firenze  
C. Benzakén, Grenoble  
J.-C. Bermond,  
Sophia-Antipolis  
N.L. Biggs, London  
B. Bollobás, Cambridge (UK)  
R.A. Brualdi, Madison (WI)  
T.H. Brylawski,  
Chapel Hill (NC)  
P.J. Cameron, London  
P. Camion, Le Chesnay  
G. Chartrand, Kalamazoo (MI)  
V. Chvátal, New Brunswick (NJ)

J. Doyen, Brussels  
D. Foata, Strasbourg  
A.S. Fraenkel, Rehovot  
P. Frankl, Murray Hill (NJ)  
A.M. Frieze, Pittsburgh (PA)  
I.M. Gessel, Waltham (MA)  
R.L. Graham,  
Murray Hill (NJ)  
A. Hajnal, Budapest  
F. Harary, Las Cruces (NM)  
D.M. Jackson, Waterloo  
J. Kahn, New Brunswick (NJ)  
G.O.H. Katona, Budapest  
D.J. Kleitman,  
Cambridge (MA)  
L. Lovász, Budapest

E.C. Milner, Calgary  
I. Rival, Ottawa  
A. Rosa, Hamilton  
S. Rudeanu, Bucharest  
G. Sabidussi, Montreal  
H. Sachs, Ilmenau  
J. Schonheim, Tel-Aviv  
M.P. Schützenberger, Paris  
J.H. Spencer, New York (NY)  
C. Thomassen, Lyngby  
W.T. Tutte, Waterloo  
D.J.A. Welsh, Oxford  
R. Wille, Darmstadt  
D.R. Woodall, Nottingham

**Publications Assistant** Nelly Segal **Desk Editor** Mick van Gijlswijk

**Publication Information.** Discrete Mathematics (ISSN 0012-365X). For 1994 volumes 121-133 are scheduled for publication. A combined subscription to Discrete Mathematics and Discrete Applied Mathematics (Vols. 48-55) at reduced rate is available. Subscription prices are available upon request from the Publisher. Subscriptions are accepted on a prepaid basis only and are entered on a calendar year basis. Issues are sent by surface mail except to the following countries where air delivery via SAL is ensured: Argentina, Australia, Brazil, Canada, Hong Kong, India, Israel, Japan, Malaysia, Mexico, New Zealand, Pakistan, China, Singapore, South Africa, South Korea, Taiwan, Thailand, USA. For all other countries airmail rates are available upon request. Claims for missing issues must be made within six months of our publication (mailing) date. Please address all your requests regarding orders and subscription queries to: Elsevier Science Publishers, Journal Department, P.O. Box 211, 1000 AE Amsterdam, Netherlands. Tel.: 31-20-5803642, fax: 31-20-5803598.

© 1993, Elsevier Science Publishers B.V. (North-Holland)

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the Publisher, Elsevier Science Publishers B.V., Copyright and Permissions Department, P.O. Box 521, 1000 AM Amsterdam, Netherlands.

*Special regulations for authors*—Upon acceptance of an article by the journal, the author(s) will be asked to transfer copyright of the article to the Publisher. This transfer will ensure the widest possible dissemination of information.

*Special regulations for readers in the USA*—This journal has been registered with the Copyright Clearance Center, Inc. Consent is given for copying of articles for personal or internal use, or for the personal use of specific clients. This consent is given on the condition that the copier pays through the Center the per-copy fee stated in the code on the first page of each article for copying beyond that permitted by Sections 107 or 108 of the US Copyright Law. The appropriate fee should be forwarded with a copy of the first page of the article to the Copyright Clearance Center, Inc., 27 Congress Street, Salem, MA 01970, USA. If no code appears in an article, the author has not given broad consent to copy and permission to copy must be obtained directly from the author. All articles published prior to 1981 may be copied for a per-copy fee of US\$ 2.25, also payable through the Center. This consent does not extend to other kinds of copying such as for general distribution, resale, advertising and promotion purposes, or for creating new collective works. Special written permission must be obtained from the Publisher for such copying. No responsibility is assumed by the Publisher for any injury and/or damage to persons or property as a matter of products liability, negligence or otherwise, or from any use or operation of any methods, products, instructions or ideas contained in the material herein. Although all advertising material is expected to conform to ethical standards, inclusion in this publication does not constitute a guarantee or endorsement of the quality or value of such products or of the claims made of it by its manufacturer.

This journal is printed on acid-free paper.

Published monthly

0012-365X/93/\$06.00

Printed in the Netherlands

## DISCRETE MATHEMATICS





---

# DISCRETE MATHEMATICS

MASTER INDEX  
VOLUMES 111-120



NORTH-HOLLAND-Amsterdam · London · New York · Tokyo

Abstracted/Indexed in: ACM Computing Reviews, Cambridge Scientific Abstracts, Current Contents: Physical, Chemical & Earth Sciences, International Abstracts in Operations Research, Mathematical Reviews, Science Citation Index, Zentralblatt für Mathematik.

© 1993, Elsevier Science Publishers B.V. All rights reserved

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the Publisher, Elsevier Science Publishers B.V., Copyright and Permissions Department, P.O. Box 521, 1000 AM Amsterdam, Netherlands.

*Special regulations for authors*—Upon acceptance of an article by the journal, the author(s) will be asked to transfer copyright of the article to the Publisher. This transfer will ensure the widest possible dissemination of information.

*Special regulations for readers in the USA*—This journal has been registered with the Copyright Clearance Center, Inc. Consent is given for copying of articles for personal or internal use, or for the personal use of specific clients. This consent is given on the condition that the copier pays through the Center the per-copy fee stated in the code on the first page of each article for copying beyond that permitted by Sections 107 or 108 of the US Copyright Law. The appropriate fee should be forwarded with a copy of the first page of the article to the Copyright Clearance Center, Inc., 27 Congress Street, Salem, MA 01970, USA. If no code appears in an article, the author has not given broad consent to copy and permission to copy must be obtained directly from the author. All articles published prior to 1981 may be copied for a per-copy fee of US\$ 2.25, also payable through the Center. This consent does not extend to other kinds of copying such as for general distribution, resale, advertising and promotion purposes, or for creating new collective works. Special written permission must be obtained from the Publisher for such copying.

0012-365X/93/\$06.00

No responsibility is assumed by the Publisher for any injury and/or damage to persons or property as a matter of products liability, negligence or otherwise, or from any use or operation of any methods, products, instructions or ideas contained in the material herein.

Although all advertising material is expected to conform to ethical standards, inclusion in this publication does not constitute a guarantee or endorsement of the quality or value of such product or of the claims made of it by its manufacturer.

This journal is printed on acid-free paper.  
Printed in the Netherlands.

#### EDITOR-IN-CHIEF

Peter L. Hammer, *RUTCOR, Rutgers University Center for Operations Research,  
P.O. Box 5062, New Brunswick, NJ 08903-5062, USA*

#### ADVISORY EDITORS

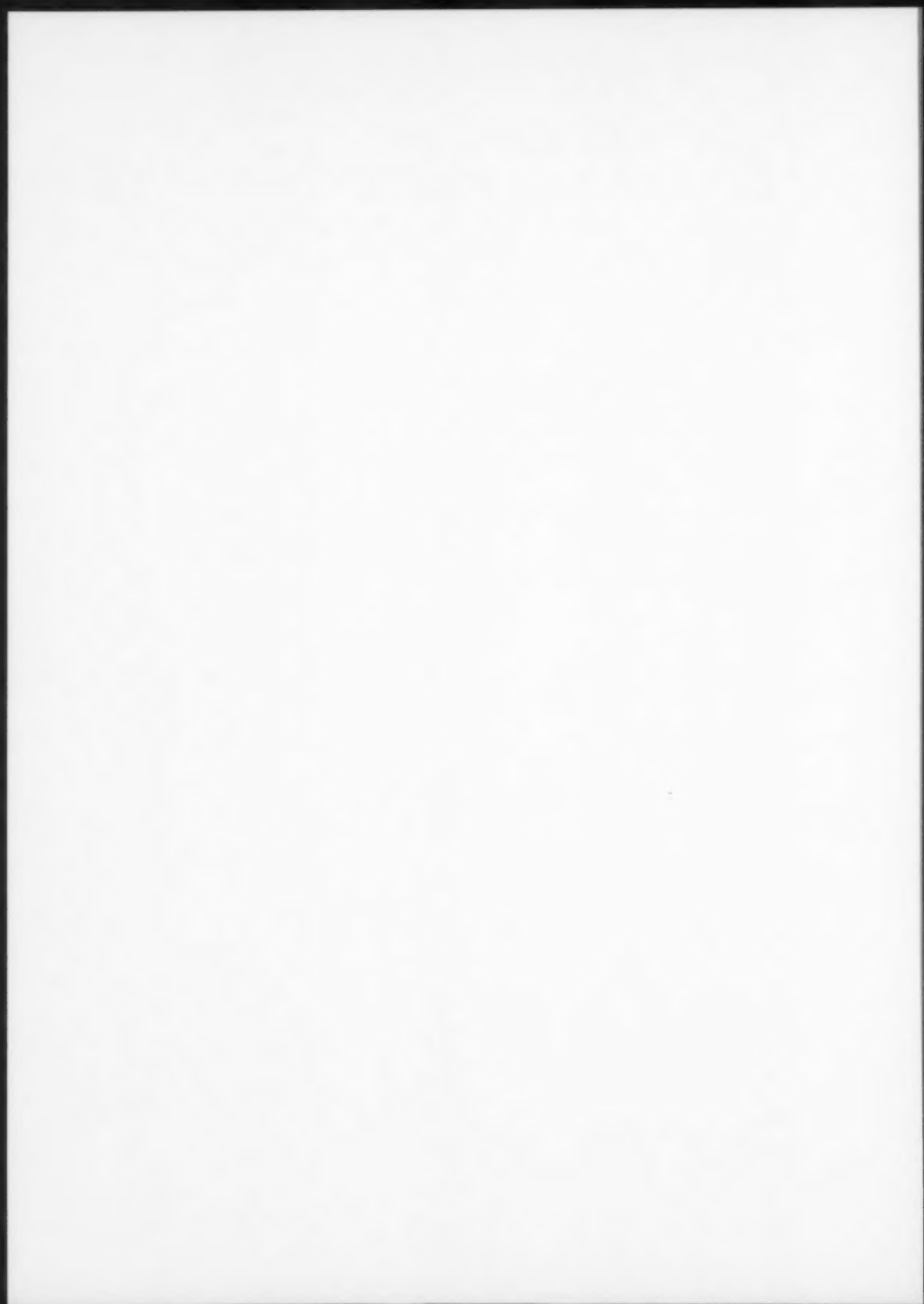
- C. Berge, *E.R. Combinatoire, Centre de Mathématique Sociale, 54 Boulevard Raspail,  
75270 Paris Cedex 06, France*
- P. Erdős, *Mathematical Institute, Hungarian Academy of Sciences, Reáltanoda u.  
13-15, H-1053 Budapest, Hungary*
- B. Grünbaum, *Department of Mathematics, University of Washington, C138,  
Badelford Hall, GN-50, Seattle, WA 98195, USA*
- M.A. Harrison, *Computer Science Division, University of California, Berkeley, CA  
94720, USA*
- A.J. Hoffman, *IBM Thomas Watson Research Center, Mathematical Sciences  
Department, P.O. Box 218, Yorktown Heights, NY 10598, USA*
- V.L. Klee, *Department of Mathematics, University of Washington, Seattle, WA 98195,  
USA*
- J.H. van Lint, *Technische Universiteit, Insulindelaan 2, 5612 AZ Eindhoven,  
Netherlands*
- R.C. Mullin, *Department of Combinatorics & Optimization, University of Waterloo,  
Waterloo, Ont., Canada N2L 3G1*
- G.-C. Rota, *Department of Mathematics, Massachusetts Institute of Technology,  
Cambridge, MA 02139, USA*
- V.T. Sós-Turán, *Elke TTK Analisís 1, Mathematical Institute, Múzeum Krt. 6-8,  
H-Budapest 8, Hungary*

#### BOARD OF EDITORS

- M.S. Aigner, *FB Mathematik, WE2, Freie Universität Berlin, Arnimallee 3, W-1000  
Berlin 33, Germany*
- B. Alspach, *Department of Mathematics & Statistics, Simon Fraser University,  
Burnaby, B.C., Canada V5A 1S6*
- G.E. Andrews, *Department of Mathematics & Statistics, Pennsylvania State Univer-  
sity, University Park, PA 16802, USA*
- A. Barlotti, *Istituto Matematico "Ulisse Dini", Viale Morgagni 67/A, I-50134 Firenze,  
Italy*
- C. Benzenen, *Institute of Advanced Mathematics, Scientific and Medical, University of  
Grenoble, BP 53X, 38041 Grenoble Cedex, France*
- J.-C. Bermond, *Informatique, CNRS, URA 1376, 3 rue Einstein, Sophia-Antipolis,  
06560 Valbonne, France*
- N.L. Biggs, *Department of Mathematics, London School of Economics, Houghton  
Street, London, UK, WC2A 2AE*
- B. Bollobás, *Department of Pure Mathematics & Mathematical Statistics, University of  
Cambridge, 16 Mill Lane, Cambridge, UK, CB2 1SB*
- R.A. Brualdi, *Department of Mathematics, University of Wisconsin-Madison, 480  
Lincoln Drive, Madison, WI 53706, USA*

- T.H. Brylawski, *Department of Mathematics, University of North Carolina, Chapel Hill, NC 27514, USA*
- P.J. Cameron, *School of Mathematical Sciences, Queen Mary College, University of London, Mile End Road, London, UK, E14NS*
- P. Camion, *INRIA, Domaine de Volucean-Rocquencourt, BP 105, Le Chesnay Cedex 78153, France*
- G. Chartrand, *Department of Mathematics, Western Michigan University, Kalamazoo, MI 49008, USA*
- V. Chvátal, *Department of Computer Science, Rutgers University, New Brunswick, NJ 08903, USA*
- J. Doyen, *Département de Mathématiques, Université de Bruxelles, Campus Plaine CP 216, Bd. du Triomphe, B-1050 Bruxelles, Belgium*
- D. Foata, *Département Mathématique, Université Louis Pasteur, 7 rue René Descartes, F-67084 Strasbourg, France*
- A.S. Fraenkel, *Department of Applied Mathematics, Weizmann Institute of Science, IL-76100 Rehovot, Israel*
- P. Frankl, *AT&T Bell Laboratories, 600 Mountain Avenue, Room 6E-206, Murray Hill, NJ 07974, USA*
- A.M. Frieze, *Department of Mathematics, Carnegie Mellon University, Pittsburgh, PA 15213, USA*
- I.M. Gessel, *Department of Mathematics, Brandeis University, P.O. Box 9110, Waltham, MA 02254-9110, USA*
- R.L. Graham, *AT&T Bell Laboratories, 600 Mountain Avenue, Room 2C-382, Murray Hill, NJ 07974, USA*
- A. Hajnal, *Mathematical Institute, Hungarian Academy of Science, Reáltanoda u. 13-15, H-1053 Budapest, Hungary*
- F. Harary, *Department of Computer Science, New Mexico State University, Las Cruces, NM 88003, USA*
- D.M. Jackson, *Combinatorics & Optimization, University of Waterloo, Waterloo, Ont., Canada N2L 3G1*
- J. Kahn, *Department of Mathematics, Rutgers University, Hill Center, Busch Campus, New Brunswick, NJ 08903, USA*
- G.O.H. Katona, *Matematik Kutató Intézet, Magyar Tudományos Akadémia, Reáltanoda u. 13-15, H-1053 Budapest, Hungary*
- D.J. Kleitman, *Department of Mathematics, Massachusetts Institute of Technology, Cambridge, MA 02139, USA*
- L. Lovász, *Mathematical Institute, Department of Computer Science, Eötvös Loránd University, Múzeum Krt. 6-8, H-1088 Budapest, Hungary*
- E.C. Milner, *Department of Mathematics, University of Calgary, Calgary, Alta., Canada T2N 1N4*
- I. Rival, *Department of Computer Science, University of Ottawa, Ottawa, Ont., Canada K1N 6N5*
- A. Rosa, *Department of Mathematics, McMaster University, Hamilton, Ont., Canada L8S 4K1*
- S. Rudeanu, *Institutei de Matematica, University of Bucharest, Str. Academiei 14, 70109 Bucuresti, Romania*

- G. Sabidussi, *Département de mathématiques et statistique, Université de Montréal, C.P. 6128 Succursale A, Montréal, Qué., Canada H3C 3J7*
- H. Sachs, *TH/Sekt. Mathematik, Rechentechnik und Kybernetik, Postfach 327, O-6300 Ilmenau, Germany*
- J. Schonheim, *Department of Mathematics, Tel Aviv University, Ramat Aviv, IL-Tel Aviv, Israel*
- M.P. Schützenberger, *U.E.R. Mathématique, Université de Paris VII, 2, place Jussieu, F-75251 Paris Cedex 5, France*
- J.H. Spencer, *The Courant Institute, New York University, 251 Mercer Street, New York, NY 10012, USA*
- C. Thomassen, *Mathematical Institute, Technical University of Denmark, Building 303, DK-2800 Lyngby, Denmark*
- W.T. Tutte, *Department of Combinatorics & Optimization, University of Waterloo, Waterloo, Ont., Canada N2L 3G1*
- D.J.A. Welsh, *Mathematical Institute, University of Oxford, 24-29 St. Giles, Oxford, UK, OX1 3LB*
- R. Wille, *Fachbereich Mathematik, Technische Hochschule Darmstadt, Schlossgartenstrasse 7, W-6100 Darmstadt, Germany*
- D.R. Woodall, *Department of Mathematics, University of Nottingham, University Park, Nottingham, UK, NG7 2RD*



## List of referees: volumes 111–120

DISCRETE MATHEMATICS has continuously benefitted from the kind assistance of a great number of referees. We hereby express our gratitude for their sustained efforts, without which our activity could not have been carried out.

the editors

S.S. Abhyankar  
M. Aigner  
A. Ainouche  
Y. Alavi  
M.O. Albertson  
N. Alon  
B. Alspach  
D. Amar  
L.D. Andersen  
G.E. Andrews  
K.T. Arasu  
D. Archdeacon  
M.H. Armanious  
E.F. Assmus Jr

A. Bachem  
H.-J. Bandelt  
J. Bang-Jensen  
F. Barahona  
I. Barany  
C. Barbut  
A. Barlotti  
D.W. Barnette  
J.P. Barthélemy  
M.M. Bayer  
R. Beazer  
J. Beck  
G. Behrendt  
L.W. Beineke  
E.A. Bender  
F.E. Bennett  
M.K. Bennett  
C. Benzaken  
C. Berge  
K.A. Berman  
J.-C. Bermond  
J. Berstel  
K. Bezdek

H. Bielak  
D. Bienstock  
N.L. Biggs  
S. Bilaniuk  
A. Blokhuis  
K.P. Bogart  
J. Boland  
J. Bonin  
J. Borges  
E. Boros  
M. Borowiecki  
A. Brandstadt  
F. Brenti  
R.C. Brigham  
H.J. Broersma  
A.E. Brouwer  
R.A. Brualdi  
A. Bruen  
F. Buckley  
F. Buekenhout

S.R. Campbell  
Y. Caro  
P.A. Catlin  
H. Chabanne  
I.M. Chakravarti  
P. Charpin  
G. Chartrand  
B. Chazelle  
G. Chen  
A.G. Chetwynd  
Chi Wang  
W. Chojnacki  
S. Chopra  
F.R.K. Chung  
V. Chvatal  
C.J. Colbourn  
M. Conforti

W. Cook  
R. Cordovil  
D.G. Corneil  
G. Cornuejols  
Y. Crama  
A.B. Cruse  
D. Cvetkovic

P. Damaschke  
M. Danuta  
B.A. Davey  
D. de Caen  
C.C. de Souza  
H.L. De Vries  
C. Delorme  
P. Delsarte  
G. Di Battista  
J.A. Dias da Silva  
R. Diestel  
G. Ding  
J. Doignon  
D.A. Drake  
A.W.M. Dress  
G. Duchamp  
P. Duchet  
A. Dur

T.C. Enns  
R.C. Entringer  
M. Erne  
R. Euler

U. Faigle  
R.J. Faudree  
O. Favaron  
M.R. Fellows

- S. Felsner  
 W. Fernandez de la Vega  
 M.A. Fiol  
 S. Fiorini  
 P.C. Fishburn  
 E.W. Formanek  
 J.L. Fouquet  
 I. Fournier  
 J.C. Fournier  
 A.S. Fraenkel  
 A. Frank  
 O. Frank  
 P. Frankl  
 A.M. Frieze  
 W. Frydrych  
 H.-L. Fu  
 S. Fujishige  
 K. Fukuda  
 Z. Füredi
- J.A. Gallian  
 R.A. Games  
 F. Gavril  
 B. Gerards  
 I. Gessel  
 J. Gimbel  
 C.D. Godsil  
 D.L. Goldsmith  
 S.W. Golomb  
 M.C. Golumbic  
 P.R. Goodey  
 P. Goossens  
 I.P. Goulden  
 D.A. Grable  
 R.L. Graham  
 J.R. Griggs  
 T.S. Griggs  
 H.O.F. Gronau  
 J.L. Gross  
 P. Gruber  
 B. Grunbaum  
 A. Gudes de Oliveira  
 A. Guenoche  
 D.R. Guichard  
 I. Gutman  
 A. Gyárfás  
 E. Gyori
- M. Habib  
 G. Hahn  
 S.L. Hakimi  
 R.J.G. Halin  
 Y.O. Hamidoune
- P. Hanlon  
 D. Hanson  
 A. Hartman  
 B.L. Hartnell  
 N.A. Hartsfield  
 D. Hartvigsen  
 R.B. Hayward  
 P. Hell  
 R.L. Hemminger  
 D. Hernek  
 A. Hertz  
 P. Higgins  
 R. Hill  
 A.J.W. Hilton  
 J.W.P. Hirschfeld  
 W. Hochstattler  
 M. Hofmeister  
 K.W. Hoke  
 R. Holzman  
 D. Horrocks  
 A. Huck  
 O. Hudry  
 C.A.J. Hurkens  
 F.K. Hwang
- T. Ibaraki  
 W. Imrich  
 G. Isaak  
 L. Iturrioz
- D.M. Jackson  
 F. Jaeger  
 J. Jegier  
 S. Jendrol  
 D.S. Johnson  
 M. Johnson  
 L.K. Jorgensen  
 A. Joyal  
 H.A. Jung  
 M. Junger  
 D. Jungnickel
- S. Kageyama  
 J. Kahn  
 G. Kalai  
 R. Kalinowski  
 M. Kano  
 A.D. Keedwell  
 D. Kelly  
 J.B. Kelly  
 A.K. Kelmans  
 J.D. Key
- A. Khelladi  
 V. Klee  
 D.J. Kelitman  
 A. Knopfmacher  
 G. Koester  
 A. Kogan  
 A.V. Kostochka  
 C. Krattenthaler  
 G. Kreweras  
 D. Krob  
 W. Kuhnel  
 P.V. Kumar
- J.C. Lagarias  
 H.-J. Lai  
 C.W.H. Lam  
 S. Landau  
 H. Laue  
 M. Laurent  
 J. Lauri  
 B. Leclerc  
 C. Lee  
 J. Lehel  
 H. Li  
 C. Lim  
 C. Lindner  
 T.E. Lindquester  
 N. Linial  
 S.L.S. Lins  
 C.H.C. Little  
 Y. Liu  
 D.C. Llewellyn  
 S.C. Locke  
 M. Loeb  
 P.J. Lorimer  
 D. Lou  
 T. Luczak  
 J. Lutzen
- G. MacGillivray  
 W. Mader  
 F. Maffray  
 S.S. Magliveras  
 N.V.R. Mahadev  
 M. Maheo  
 A.R. Mahjoub  
 E. Makai  
 J. Malik  
 J. Malkevitch  
 Y. Manoussakis  
 A. Marczyk  
 J.S. Martins  
 D. Marusic



- |                 |                  |                     |
|-----------------|------------------|---------------------|
| R. Mathon       | A. Pluhar        | A. Schrijver        |
| M. Matsumoto    | N. Polat         | E. Schulte          |
| S.B. Maurer     | S. Poljak        | C. Schulz           |
| W. McCuaig      | A. Pott          | S. Schuster         |
| S. McGuinness   | M. Preissmann    | M.P. Schutzenberger |
| B.D. McKay      | A. Prekopa       | A.J. Schwenk        |
| T.A. McKee      | A. Proskurowski  | J.R. Seberry        |
| P. McMullen     | J.S. Provan      | A. Sebo             |
| K. Mehlhorn     | W.R. Pulleyblank | J.J. Seidel         |
| R.A. Melter     | A. Pultr         | P.D. Seymour        |
| E. Mendelsohn   |                  | K.R. Shah           |
| R. Meshulam     |                  | D. Shallcross       |
| K. Metsch       | M. Randic        | L.W. Shapiro        |
| H. Meyniel      | R.C. Read        | J. Sheehan          |
| D.J. Miller     | K.B. Reid        | Y. Shi              |
| W.H. Mills      | K. Reuter        | M.A. Shokrollahi    |
| E.C. Milner     | D. Richards      | H. Siemon           |
| J. Min Yu       | R.B. Richter     | R.E. Simion         |
| S. Minsker      | R.D. Ringelsen   | C.C. Sims           |
| J.A. Mitchem    | G. Ringel        | J. Siran            |
| B. Mohar        | C. Rodger        | Z. Skupień          |
| R.H. Mohring    | V. Rodl          | W.D. Smith          |
| J.W. Moon       | A. Rosa          | P. Solé             |
| O. Moreno       | I.G. Rosenberg   | V. Soltan           |
| P. Moszkowski   | M. Rosenfeld     | V.T. Sos            |
| A.F. Mouyart    | G.-C. Rota       | J. Spinrad          |
| H.M. Mulder     | U.G. Rothblum    | R. Sritharan        |
| G.L. Mullen     | A. Rucinski      | D. Stanton          |
| R.C. Mullin     | S. Rudeanu       | R.G. Stanton        |
| J. Mykkeltveit  | S. Ruiz          | W. Staton           |
|                 | F. Ruskey        | S.K. Stein          |
|                 | A. Rycerz        | G. Steiner          |
| M.B. Nathanson  |                  | M. Stiebitz         |
| J.I. Naus       |                  | D.R. Stinson        |
| R. Nedela       | G. Sabidussi     | K.B. Stolarsky      |
| J. Nešetřil     | H. Sachs         | M.V. Subbarao       |
| H. Niederhausen | B.E. Sagan       | R.A. Sulanke        |
| H. Niederreiter | D. Sakai         | D.P. Sumner         |
| F. Nielsen      | M. Saks          | M.M. Syslo          |
| H. Noltemeier   | L. Salinas       | A. Szelečka         |
| R. Nowakowski   | J.F. Sallee      |                     |
|                 | A. Salomaa       | C. Tabib            |
| S. Olariu       | L.A. Sanchis     | G. Tallini          |
| B. Or           | K.S. Sarkaria    | F. Tamari           |
| J.B. Orlin      | A. Sassano       | L. Teirlinck        |
| J.G. Oxley      | N.W. Sauer       | P. Terwilliger      |
|                 | C. Savage        | C. Thomassen        |
|                 | E.R. Scheinerman | A. Tietavainen      |
|                 | P. Schellenberg  | B. Toft             |
| M. Padberg      | R.H. Schelp      | T. Tokuyama         |
| Z. Palka        | I. Schiermeyer   | I. Tomescu          |
| C. Payan        | E. Schmeichel    | V.D. Tonchev        |
| U.N. Peled      | F. Schmidt       | R. Tosic            |
| K.T. Phelps     | M. Schneider     | M. Truszczyński     |
| V.S. Pless      | J. Schonheim     |                     |

A. Tucker	D.J.A. Welsh	D.R. Woodall
Z. Tuza	E. Welzl	R.E. Woodrow
	R. Wenger	N.C. Wormald
B. Uhrin	W. Wenzel	M. Wozniak
K. Ushio	H. Werner	R. Wright
	D.B. West	
	L. Whitaker	
G. Valette	A.T. White	S.-J. Xu
J. van den Heuvel	D.E. White	
J.H. van Lint	E.G. Whitehead Jr	
S.A. Vanstone	H.A. Wilbrink	M. Yamada
H.J. Veldman	P. Wild	H.P. Yap
P.D. Vestergaard	S. Williamson	J.L.A. Yebra
E. Vetter	B.J. Wilson	Q. Yu
A. Vince	R.J. Wilson	
L. Volkmann	P.M. Winkler	
	P. Winter	J. Zaks
	D.R. Witte	D. Zeilberger
D.G. Wagner	W. Woess	B. Zelinka
W.D. Wallis	J. Wojcieszowski	M. Ziegler
H. Walther	A.P. Wojda	V.A. Zinoviev
H. Ward	L.A. Wolsey	

## Master index of volumes 111–120

Abhyankar, S.S., Wreath products and enlargements of groups	120 (1993)	1– 12
Aguiló, F., see Esqué, P.	114 (1993)	147–157
Aharoni, R. and I.B.-A. Hartman, On Greene-Kleitman's theorem for general digraphs	120 (1993)	13– 24
Akiyama, J., K. Hosono and M. Urabe Some combinatorial problems	116 (1993)	291–298
Alavi, Y., J. Liu and J. Wang, Highly irregular digraphs	111 (1993)	3– 10
Alon, N., Y. Caro and I. Krasikov, Bisection of trees and sequences	114 (1993)	3– 7
Alspach, B. and C.-Q. Zhang, Cycle covers of cubic multi-graphs	111 (1993)	11– 17
Althöfer, I. and E. Triesch, Edge search in graphs and hypergraphs of bounded rank	115 (1993)	1– 9
Amar, D., Applying a condition for a hamiltonian bipartite graph to be bipancyclic	111 (1993)	19– 25
Amar, D., Irregularity strength of regular graphs of large degree	114 (1993)	9– 17
Anderson, M.R., see Hughes, R.B.	117 (1993)	253–256
Anthony, M. and N. Biggs, The mean chromatic number of paths and cycles ( <i>Note</i> )	120 (1993)	227–231
Archdeacon, D. and J. Dinitz, Indecomposable triple systems exist for all $\lambda$	113 (1993)	1– 6
Asté-Vidal, A. and V. Dugat, Autonomous parts and decomposition of regular tournaments	111 (1993)	27– 36
Bacsó, G. and Z. Tuza, Domination properties and induced subgraphs	111 (1993)	37– 40
Balca, L., Sum of lengths of inversions in permutations	111 (1993)	41– 48
Balińska, K.T. and L.V. Quintas, The sequential generation of random $f$ -graphs. Distributions and predominant types of edge maximal $f$ -graphs with $f > 4$	114 (1993)	19– 22
Bao, X., A constructing method of a class of $SIDS(n)$ ( <i>Note</i> )	120 (1993)	233–239
Barrett, W.W., see Johnson, C.R.,	119 (1993)	97–106
Barthélemy, J.-P. and J. Constantin, Median graphs, parallelism and posets	111 (1993)	49– 63

- Batten, L.M., A characterization of finite linear spaces on  $v$  points,  $n^2 \leq v < (n+1)^2$ , and  $b = n^2 + n + 3$  lines,  $n \geq 10$  118 (1993) 1- 9
- Batten, L.M., The nonexistence of finite linear spaces with  $v = n^2$  points and  $b = n^2 + n + 2$  lines 115 (1993) 11- 15
- Bedford, D., Construction of orthogonal latin squares using left neofields 115 (1993) 17- 38
- Bedrossian, P., G.Chen and R.H. Schelp, A generalization of Fan's condition for Hamiltonicity, pancyclicity, and Hamiltonian connectedness 115 (1993) 39- 50
- Belfer, A. and M.C. Golumbic, Counting endpoint sequences for interval orders and interval graphs 114 (1993) 23- 39
- Bellantoni, S., I.B.-A. Hartman, T. Przytycka and S. Whitesides, Grid intersection graphs and boxicity 114 (1993) 41- 49
- Benhocine, A. and A.P. Wojda, Graphs with every matching contained in a cycle 118 (1993) 11- 21
- Bennett, F.E., J. Yin and L. Zhu, On the existence of perfect Mendelsohn designs with  $k=7$  and  $\lambda$  even 113 (1993) 7- 25
- Berger, T. and P. Charpin, The automorphism group of Generalized Reed-Muller codes 117 (1993) 1- 17
- Berman, A., see Kogan, N. 114 (1993) 297-304
- Berman, J.D., E.W. Kiss, P. Pröhle and Á. Szendrei, The set of types of a finitely generated variety 112 (1993) 1- 20
- Bermond, J.-C., N. Homobono and C. Peyrat, Connectivity of Kautz networks 114 (1993) 51- 62
- Biggs, N., see Anthony, M. 120 (1993) 227-231
- Blázsik, Z., M. Hujter, A. Pluhár and Z. Tuza, Graphs with no induced  $C_4$  and  $2K_2$  115 (1993) 51- 55
- Böröczky, K., N. Sauer and X. Zhu, Inexhaustible homogeneous structures 115 (1993) 57- 63
- Bogart, K.P., An obvious proof of Fishburn's interval order theorem (Note) 118 (1993) 239-242
- Bolla, M., Spectra, Euclidean representations and clusterings of hypergraphs 117 (1993) 19- 39
- Bond, J. and C. Delorme, A note on partial Cayley graphs 114 (1993) 63- 74
- Bonin, J.E., Modular elements of higher-weight Dowling lattices 119 (1993) 3- 11
- Borges, J. and J. Rifa, A note about multidesigns and extended designs 111 (1993) 65- 69
- Borowiecki, M. and E. Drgas-Burchardt, Classes of chromatically unique graphs 111 (1993) 71- 75
- Bouchet, A., Recognizing locally equivalent graphs 114 (1993) 75- 86
- Brand, N. and S. Sutinuntopas, One-factors and the existence of affine designs 120 (1993) 25- 35

- Brawley, J.V. and D. Brown, Composed products and module polynomials over finite fields 117 (1993) 41- 56
- Breckenridge, J.W., K. Varadarajan and K.H. Wehrhahn, Chains, multichains and Möbius numbers 120 (1993) 37- 50
- Bremser, P.S., Congruence classes of matrices in  $GL_2(F_q)$  (Note) 118 (1993) 243-249
- Broersma, H.J. and F. Göbel, Coloring a graph optimally with two colors 118 (1993) 23- 31
- Brouwer, A.E. and J.H. Koolen, A new infinite series of regular uniformly geodetic code graphs (Note) 120 (1993) 241-248
- Brouwer, A.E., On complete regularity of extended codes (Note) 117 (1993) 271-273
- Brock, B.W., A new construction of circulant  $GH(p^2; Z_p)$  (Note) 112 (1993) 249-252
- Brown, D., see Brawley, J.V. 117 (1993) 41- 56
- Brown, J.I. and S. Watson, Mutually complementary partial orders 113 (1993) 27- 39
- Cai, M.-c., An algorithm for optimum common root functions of two digraphs 119 (1993) 13- 20
- Cameron, P.J. and C.E. Praeger, Block-transitive  $t$ -designs I: point-imprimitive designs 118 (1993) 33- 43
- Carlet, C., A general case of formal duality between binary nonlinear codes 111 (1993) 77- 85
- Caro Y. and Z. Tuza, Bounded degrees and prescribed distances in graphs 111 (1993) 87- 93
- Caro, Y., see Alon, N. 114 (1993) 3- 7
- Cedeño, W., see Dejter, I.J. 114 (1993) 131-135
- Chabanne, H. and N. Sendrier, On the concatenated structures of a  $[49, 18, 12]$  binary abelian code (Communication) 112 (1993) 245-248
- Chaimovich, M., Fast exact and approximate algorithms for  $k$ -partition and scheduling independent tasks 114 (1993) 87-103
- Chakravarti, I.M., A three-class association scheme on the flags of a finite projective plane and a (PBIB) design defined by the incidence of the flags and the Baer subplanes in  $PG(2, q^2)$  (Note) 120 (1993) 249-252
- Chakravarti, I.M., Geometric construction of some families of two-class and three-class association schemes and codes from nondegenerate and degenerate Hermitian varieties 111 (1993) 95-103
- Chameni Nembua, C. and B. Monjardet, Finite pseudo-complemented lattices and 'permutoedre' 111 (1993) 105-112

- Chang, Y., see Kang, Q. 118 (1993) 263-268
- Chao, C.-Y. and Z. Chen, On uniquely 3-colorable graphs 112 (1993) 21- 27
- Charpin, P., see Berger, T. 117 (1993) 1- 17
- Chee, Y.M., The existence of a simple 3-(28, 5, 30) design (*Note*) 118 (1993) 251-252
- Chen, C. and J. Wang, Factors in graphs with odd-cycle property 112 (1993) 29- 40
- Chen, C.C., K.M. Koh and Y.H. Peng, On the higher-order edge toughness of a graph 111 (1993) 113-123
- Chen, G., Hamiltonian graphs involving neighborhood intersections (*Note*) 112 (1993) 253-257
- Chen, G., see Bedrossian, P. 115 (1993) 39- 50
- Chen, W.Y.C. and R.P. Stanley, Derangements on the  $n$ -cube 115 (1993) 65- 75
- Chen, Z.-H., Spanning closed trails in graphs 117 (1993) 57- 71
- Chen, Z., see Chao, C.-Y. 112 (1993) 21- 27
- Chilakamarri, K.B. and P. Hamburger, On a class of kernel-perfect and kernel-perfect-critical graphs (*Note*) 118 (1993) 253-257
- Chiricota, Y. and G. Labelle, Familles de solutions combinatoires de  $y' = 1 + y^2$  et d'équations différentielles autonomes 115 (1993) 77- 93
- Choi, S. and P. Guan, A spanning tree of the  $2^m$ -dimensional hypercube with maximum number of degree-preserving vertices (*Note*) 117 (1993) 275-277
- Chow, T., Distances forbidden by two-colorings of  $\mathbb{Q}^3$  and  $A_n$  115 (1993) 95-102
- Chung, F.R.K. and R.L. Graham, On hypergraphs having evenly distributed subhypergraphs 111 (1993) 125-129
- Clapham, C.R.J. and J. Sheehan, All trees are 1-embeddable and all except stars are 2-embeddable (*Note*) 120 (1993) 253-259
- Cohen, G.D. and G. Zemor, Write-isolated memories (WIMs) 114 (1993) 105-113
- Colbourn, C.J. and E.S. Elmallah, Reliable assignments of processors to tasks and factoring on matroids 114 (1993) 115-129
- Colbourn, C.J. and E.S. Mahmoodian, Support sizes of sixfold triple systems 115 (1993) 103-131
- Conder, M., Generating the Mathieu groups and associated Steiner systems 112 (1993) 41- 47
- Conforti, M. and M.R. Rao, Articulations sets in linear perfect matrices I: forbidden configurations and star cutsets (*Addendum*) 120 (1993) 309
- Constantin, J., see Barthélemy, J.-P. 112 (1993) 49- 63
- Cordovil, R. and M.L. Moreira, A homotopy theorem on oriented matroids 111 (1993) 131-136
- Curran, S.J., Hamilton paths in Cayley digraphs of metacyclic groups 115 (1993) 133-139

da Silva, I.P.F., On filings of $2N$ -gons with rhombi	111 (1993)	137-144
de Werra, D., see Mahadev, N.V.R.	111 (1993)	361-366
Damaschke, P., Paths in interval graphs and circular arc graphs	112 (1993)	49- 64
Davey, B.A. and H.A. Priestley, Partition-induced natural dualities for varieties of pseudo-complemented distributive lattices	113 (1993)	41- 58
Davis, J.A., New constructions of divisible designs ( <i>Note</i> )	120 (1993)	261-268
Dénes, J. and G.L. Mullen, Enumeration formulas for latin and frequency squares	111 (1993)	157-163
Delest, M.P. and J.M. Fedou, Enumeration of skew Ferrers diagrams	112 (1993)	65- 79
DeTemple, D., see McAvaney, K.	113 (1993)	131-142
DeTemple, D.W., M.J. Dineen, J.M. Robertson and K.L. McAvaney, Recent examples in the theory of partition graphs ( <i>Note</i> )	113 (1993)	255-258
Dejter, I.J., W. Cedeño and V. Jauregui, A note on Frucht diagrams, Boolean graphs and Hamilton cycles	114 (1993)	131-135
Delorme C., Eigenvalues of finite graphs	114 (1993)	137-146
Delorme, C. and S. Poljak, The performance of an eigenvalue bound on the max-cut problem in some classes of graphs	111 (1993)	145-156
Delorme, C., see Bond, J.	114 (1993)	63- 74
Deza, M. and M. Laurent, The even and odd cut polytopes	119 (1993)	49- 66
Deza, M., K. Fukuda and M. Laurent, The inequicut cone	119 (1993)	21- 48
Dineen, M.J., see DeTemple, D.W.	113 (1993)	255-258
Ding, G., Clutters with $\tau_2 = 2\tau$	115 (1993)	141-152
Ding, G., Disjoint circuits on a Klein bottle and a theorem on posets	112 (1993)	81- 91
Ding, G., Monotone clutters	119 (1993)	67- 77
Ding, G., Stable sets versus independent sets	117 (1993)	73- 87
Dinitz, J., see Archdeacon, D.	113 (1993)	1- 6
Dolan, P. and M. Halsey, Random edge domination ( <i>Note</i> )	112 (1993)	259-260
Đoković, D.Ž., Williamson matrices of order $4n$ for $n = 33, 35, 39$ ( <i>Note</i> )	115 (1993)	267-271
Drgas-Burchardt, E., see Borowiecki, M.	111 (1993)	71- 75
Du, Q., On $\sigma$ -polynomials and a class of chromatically unique graphs	115 (1993)	153-165
Duchet, P. and H. Meyniel, Kernels in directed graphs: a poison game ( <i>Note</i> )	115 (1993)	273-276
Dugat, V., see Asté-Vidal, A.	111 (1993)	27- 36
Dulucq, S. et J.-G. Penaud., Cordes, arbres et permutations	117 (1993)	89-105

Eggleton, R.B., A.S. Fraenkel and R.J. Simpson, Beatty sequences and Langford sequences	111 (1993)	165-178
Eliahou, S., The $3x+1$ problem: new lower bounds on nontrivial cycle lengths	118 (1993)	45- 56
Elmallah, E.S., see Colbourn, C.J.	114 (1993)	115-129
Erdős, P. and C.C. Rousseau, The size Ramsey number of a complete bipartite graph ( <i>Note</i> )	113 (1993)	259-262
Erdős, P. and F. Galvin, Monochromatic infinite paths	113 (1993)	59- 70
Erdős, P., Z. Füredi, J. Pach and I.Z. Ruzsa, The grid revisited	111 (1993)	189-196
Erdős, P.L., A new bijection on rooted forests	111 (1993)	179-188
Esqué, P., F. Aguiló and M.A. Fiol, Double commutative-step digraphs with minimum diameters	114 (1993)	147-157
Fan, C.K., Matchings and the sum function ( <i>Communication</i> )	120 (1993)	205-209
Faudree, R.J. and D.J. Knisley, A neighborhood condition which implies the existence of a complete multipartite subgraph	118 (1993)	57- 68
Favaron, O., M. Mahéo and J-F. Saclé, Some eigenvalue properties in graphs (conjectures of Graffiti — II)	111 (1993)	197-220
Fedou, J.M., see Delest, M.P.	112 (1993)	65- 79
Felzenbaum, A., R. Holzman and D.J. Kleitman, Packing lines in a hypercube	117 (1993)	107-112
Fiol, M.A., see Esqué, P.	114 (1993)	147-157
Fiol, M.A., see Gómez, J.	114 (1993)	219-235
Flajolet, P. and M. Soria, General combinatorial schemas: Gaussian limit distributions and exponential tails	114 (1993)	159-180
Flandrin, E., J.L. Fouquet and H. Li, On hamiltonian claw-free graphs	111 (1993)	221-229
Fon-Der-Flaass, D.G. and A.V. Kostochka, Covering boxes by points ( <i>Note</i> )	120 (1993)	269-275
Fouquet, J.L. and H. Thuillier, Decomposition of 3-connected cubic graphs	114 (1993)	181-198
Fouquet, J.L., see Flandrin, E.	111 (1993)	221-229
Fraenkel, A.S., see Eggleton, R.B.	111 (1993)	165-178
Franek, F. and V. Rödl, 2-Colorings of complete graphs with a small number of monochromatic $K_4$ subgraphs	114 (1993)	199-203
Frank, A., Submodular functions in graph theory	111 (1993)	231-243
Freiman, G.A., New analytical results in subset-sum problem	114 (1993)	205-218
Frieze, A. and B. Reed, Polychromatic Hamilton cycles	118 (1993)	69- 74
Füredi, Z., see Erdős, P.	111 (1993)	189-196



- Fujikoshi, Y., Two-way ANOVA models with unbalanced data 116 (1993) 315-334
- Fukuda, K. and K. Handa, Antipodal graphs and oriented matroids 111 (1993) 245-256
- Fukuda, K., see Deza, M. 119 (1993) 21- 48
- Galvin, F., see Erdős, P. 113 (1993) 59- 70
- Gao, G.-G., On consecutive numbers of the same height in the Collatz problem (*Note*) 112 (1993) 261-267
- Gao, S. and W. Wei, On non-Abelian group difference sets 112 (1993) 93-102
- Garcia, C. and P. Solé, Diameter lower bounds for Waring graphs and multiloop networks 111 (1993) 257-261
- Gionfriddo, M. and G. Lo Faro, 2-Colourings in  $S(t, t+1, v)$  111 (1993) 263-268
- Göbel, F., see Broersma, H.J. 118 (1993) 23- 31
- Gómez, J., M.A. Fiol and O. Serra, On large  $(\Delta, D)$ -graphs 114 (1993) 219-235
- Goemans, M.X., A generalization of Petersen's theorem (*Note*) 115 (1993) 277-282
- Goldman, A.J., see Robinson, A.G. 112 (1993) 173-184
- Golemac, A., Construction of new symmetric designs with parameters  $(70, 24, 8)$  120 (1993) 51- 58
- Golumbic, M.C., see Belfer, A. 114 (1993) 23- 39
- Gould, R.J. and V. Rödl, On isomorphic subgraphs (*Note*) 118 (1993) 259-262
- Goulden, I.P. and S. Pepper, Labelled trees and factorizations of a cycle into transpositions (*Note*) 113 (1993) 263-268
- Graham, R.L., see Chung, F.R.K. 111 (1993) 125-129
- Gropp, H., Configurations and graphs 112 (1993) 269-276
- Guan, P., see Choi, S. (*Note*) 117 (1993) 275-277
- Gubser, B.S., Planar graphs with no 6-wheel minor 120 (1993) 59- 73
- Guénoche, A., Énumération des partitions de diamètre minimum 111 (1993) 277-287
- Habib, M., M. Morvan and J.-X. Rampon, On the calculation of transitive reduction - closure of orders 111 (1993) 289-303
- Habsieger, L., Inégalités entre fonctions symétriques élémentaires: applications à des problèmes de log-concavité 115 (1993) 167-174
- Hajnal, A. and N. Sauer, Cut-sets in infinite graphs and partial orders 117 (1993) 113-125
- Halsey, M., see Dolan, P. 112 (1993) 259-260
- Hamada, N., A characterization of some  $[n, k, d; q]$ -codes meeting the Griesmer bound using a minihyper in a finite projective geometry 116 (1993) 229-268
- Hamada, N., T. Helleseth and Ø. Ytrehus, Characterization of  $\{2(q+1)+2, 2; t, q\}$ -minihypers in  $PG(t, q)$  ( $t \geq 3$ ,  $q \in \{3, 4\}$ ) 115 (1993) 175-185

- Hamburger, P., see Chilakamarri, K.B. 118 (1993) 253-257
- Hammer, P.L., N.V.R. Mahadev and U.N. Peled, Bipartite bithreshold graphs 119 (1993) 79-96
- Handa, K., see Fukuda, K. 111 (1993) 245-256
- Hansen, P., A. Hertz and J. Kuplinsky, Bounded vertex colorings of graphs 111 (1993) 305-312
- Harant, J., Toughness and nonhamiltonicity of polyhedral graphs (*Communication*) 113 (1993) 249-253
- Hartman, I.B.-A., see Aharoni, R. 120 (1993) 13-24
- Hartman, I.B.-A., see Bellantoni, S. 114 (1993) 41-49
- Heden, O., Maximal partial spreads and the modular  $n$ -queen problem 120 (1993) 75-91
- Heden, O., On the modular  $n$ -queen problem (*Addendum*) 118 (1993) 293
- Hell, P. and K. Seyffarth, Largest planar graphs of diameter two and fixed maximum degree 111 (1993) 313-322
- Hellesest, T., see Hamada, N. 115 (1993) 175-185
- Henning, M.A. and H.C. Swart, Bounds relating generalized domination parameters 120 (1993) 93-105
- Hertz, A., see Hansen, P. 111 (1993) 305-312
- Hilton, A.J.W. and H.R. Hind, The total chromatic number of graphs having large maximum degree 117 (1993) 127-140
- Hilton, A.J.W., Recent results on the total chromatic number 111 (1993) 323-331
- Hind, H.R., see Hilton, A.J.W. 117 (1993) 127-140
- Ho, Y., see Shee, S.-C. 117 (1993) 225-243
- Holton, D.A., D. Lou and M.D. Plummer, On the 2-extensibility of planar graphs (*Corrigendum*) 118 (1993) 295-297
- Holton, D.A., see Lou, D. 112 (1993) 139-150
- Holzman, R., see Felzenbaum, A. 117 (1993) 107-112
- Homobono, N., see Bermond, J.-C. 114 (1993) 51-62
- Hosono, K., see Akiyama, J. 116 (1993) 291-298
- Hougardy, S., Counterexamples to three conjectures concerning perfect graphs (*Communication*) 117 (1993) 245-251
- Huang, T. and M. Laurent,  $(s, r, \mu)$ -nets and alternating forms graphs 114 (1993) 237-252
- Hughes, R.B. and M.R. Anderson, A triangulation of the 6-cube with 308 simplices (*Communication*) 117 (1993) 253-256
- Hughes, R.B., Minimum-cardinality triangulations of the  $d$ -cube for  $d=5$  and  $d=6$  118 (1993) 75-118
- Hujter M., see Blázsik, Z. 115 (1993) 51-55
- Ivashchenko, A.V., The coordinate representation of a graph and  $n$ -universal graph of radius 1 120 (1993) 107-114

Jørgensen, L.K., Nonexistence of certain cubic graphs with small diameters	114 (1993)	265-273
Jackson, B.W., Universal cycles of $k$ -subsets and $k$ -permutations	117 (1993)	141-150
Jaeger, F., Plane graphs and link invariants	114 (1993)	253-264
Jansen, K., Transfer flow graphs	115 (1993)	187-199
Jauregui, V., see Dejter, I.J.	114 (1993)	131-135
Jégou, P., see Vilarem, M.-C.	111 (1993)	333-344
Jendrol', S., On face vectors and vertex vectors of convex polyhedra	118 (1993)	119-114
Jimbo, M., Recursive constructions for cyclic BIB designs and their generalizations	116 (1993)	79- 95
Johnson, C.R. and W.W. Barrett, Determinantal inequalities for positive definite matrices	119 (1993)	97-106
Kageyama, S., Experimental design: methods and applications An updated bibliography of books in English	116 (1993)	369-403
Kageyama, S., Robustness of some balanced block designs	116 (1993)	159-181
Kageyama, S., The family of block designs with some combinatorial properties	116 (1993)	17- 54
Kang Q. and Y. Chang, Further results about large sets of disjoint Mendelsohn triple sysems ( <i>Note</i> )	118 (1993)	263-268
Karchmer, M., N. Linial, I. Newman, M. Saks and A. Wigderson, Combinatorial characterization of read-once formulae	114 (1993)	275-282
Katerinis, P., Regular factors in regular graphs ( <i>Note</i> )	113 (1993)	269-274
Kharaghani, H., A construction for Hadamard matrices	120 (1993)	115-120
Kim, J.H., On 3-colorings of $E(K_n)$ ( <i>Note</i> )	118 (1993)	269-273
Kirchherr, W.W., NEPS operations on cordial graphs	115 (1993)	201-209
Kiss, E.W., see Berman, J.D.	112 (1993)	1- 20
Klein, C.S. and S. Minsker, The super towers of Hanoi problem: large rings on small rings	114 (1993)	283-295
Kleitman, D.J., see Felzenbaum, A.	117 (1993)	107-112
Knisley, D.J., see Faudree, R.J.	118 (1993)	57- 68
Knopfmacher, A. and J. Knopfmacher, Counting irreducible factors of polynomials over a finite field	112 (1993)	103-118
Knopfmacher, J., see Knopfmacher, A.	112 (1993)	103-118
Kogan, N. and A. Berman, Characterization of completely positive graphs	114 (1993)	297-304
Koh, K.M., see Chen, C.C.	112 (1993)	113-123
Koike, K., On a conjecture of Stanley on Jack symmetric functions	115 (1993)	211-216
Koolen, J.H., see Brouwer, A.E.	120 (1993)	241-248

- Korach, E. and Z. Ostfeld, Recognition of DFS trees: sequential and parallel algorithms with refined verifications 114 (1993) 305-327
- Kostochka, A.V., see Fon-Der-Flaass 120 (1993) 269-275
- Krasikov, I., see Alon, N. 114 (1993) 3-7
- Kratzke, T.M. and D.B. West, The total interval number of a graph, I: Fundamental classes 118 (1993) 145-156
- Kupitz, Y.S., On convex segments in a triangulation (*Note*) 120 (1993) 277-285
- Kupitz, Y.S., On the existence of a combinatorial Schlegel diagram of a simplicial unstacked 3-polytope with a prescribed set of vertices 120 (1993) 121-134
- Kuplinsky, J., see Hansen, P. 111 (1993) 305-312
- Kuriki, S., On existence and construction of balanced arrays 116 (1993) 137-155
- Kuwada, M., Analysis of variance of balanced fractional factorial designs 116 (1993) 335-366
- Kuwada, M., Robustness of balanced fractional  $2^m$  factorial designs derived from simple arrays 116 (1993) 183-208
- La Poutré, J.A., J. van Leeuwen and M.H. Overmars, Maintenance of 2- and 3-edge-connected components of graphs I 114 (1993) 329-359
- Labahn, R., Information flows on hypergraphs 113 (1993) 71-97
- Labelle, G., see Chiricota Y. 115 (1993) 77-93
- Lalanne, J.C., Polyominos parallélogrammes à franges et fonctions de Bessel 115 (1993) 217-230
- Lambeck, E.W., On distance regular graphs with  $c_i = b_i$  (*Note*) 113 (1993) 275-276
- Lamken, E.R. and S.A. Vanstone, Existence results for doubly near resolvable  $(n, 3, 2)$ -BIBDs 120 (1993) 135-148
- Laurent, M., see Deza, M. 119 (1993) 21-48
- Laurent, M., see Deza, M. 119 (1993) 49-66
- Laurent, M., see Huang, T. 114 (1993) 237-252
- Leclerc, B., Lattice valuations, medians and majorities 111 (1993) 345-356
- Leimer, H.-G., Optimal decomposition by clique separators 113 (1993) 99-123
- Lengvárszky, Z., Distributive sublattices and weakly independent subsets in modular lattices (*Note*) 112 (1993) 269-273
- Levy, R. and E. Shamir, A note on a counting problem arising in percolation theory 114 (1993) 361-365
- Li, H., see Flandrin, E. 111 (1993) 221-229
- Libkin, L., Direct product decompositions of lattices, closures and relation schemes 112 (1993) 119-138
- Lih, K.-W., Rank inequalities for chordal graphs 113 (1993) 125-130

Lindner, C.C. and C.A. Rodger, A partial $m=(2k+1)$ -cycle system of order $n$ can be embedded in an $m$ -cycle system of order $(2n+1)m$	117 (1993)	151-159
Lindström, B., On algebraic matroids	111 (1993)	357-359
Linial, N., see Karchmer, M.	114 (1993)	275-282
Lipkin, E., On subset sums of $r$ -sets	114 (1993)	367-377
Liu, J., see Alavi, Y.	111 (1993)	3-10
Lo Faro, G., see M. Gionfriddo	111 (1993)	263-268
Loeb, D.E., Towards the critical problem: on the co-algebraic relation between sets and multisets	118 (1993)	157-164
Lou, D. and D.A. Holton, Lower bound of cyclic edge connectivity for $n$ -extendability of regular graphs	112 (1993)	139-150
Lou, D., see Holton, D.A.	118 (1993)	295-297
Lu, X., Claws contained in all $n$ -tournaments	119 (1993)	107-111
Lu, Z., The harmonious chromatic number of a complete binary and trinary tree	118 (1993)	165-172
Luczak, T., The size of the largest hole in a random graph	112 (1993)	151-163
Lundgren, J.R. and C.W. Rasmussen, Two-step graphs of trees	119 (1993)	123-139
Lundgren, J.R., C.W. Rasmussen and J.S. Maybee, Internal competition graphs of symmetric digraphs	119 (1993)	113-122
Mafray, F., Antitwins in partitionable graphs ( <i>Note</i> )	112 (1993)	275-278
Mahadev, N.V.R., P. Solot and D. de Werra, The cyclic compact open-shop scheduling problem	111 (1993)	361-366
Mahadev, N.V.R., see Hammer P.L.	119 (1993)	79-96
Mahéo, M., see Favaron, O.	111 (1993)	197-220
Mahmoodian, E.S., see Colbourn, C.J.	115 (1993)	103-131
Maire, F., A characterization of intersection graphs of the maximal rectangles of a polyomino ( <i>Communication</i> )	120 (1993)	211-214
Maire, F., Une note sur les contractions dans les polygones orthogonaux	111 (1993)	367-371
Maurras, J.F., Hypergraphes de Petersen! Hypergraphes de Moore?	111 (1993)	373-379
Maurras, J.F., The line-polytope of a finite affine plane ( <i>Note</i> )	115 (1993)	283-286
Maybee, J.S., see Lundgren, J.R.	119 (1993)	113-122
Mayer, J., Case 6 of Hadwiger's conjecture. III. The problem of 7-vertices	111 (1993)	381-387
McAvaney, K., J. Robertson and D. DeTemple, A characterization and hereditary properties for partition graphs	113 (1993)	131-142
McAvaney, K.L., see DeTemple, D.W.	113 (1993)	255-258
McDiarmid, C.J.H. and A. Sánchez-Arroyo, An upper bound for total colouring of graphs	111 (1993)	389-392
Meyniel, H. see Duchet, P.	115 (1993)	273-276

- Middendorf, M. and F. Pfeiffer, Weakly transitive orientations, Hasse diagrams and string graphes 111 (1993) 393-400
- Milici, S., see Quattrocchi, G. 115 (1993) 287-291
- Minsker, S., see Klein, C.S. 114 (1993) 283-295
- Mohar, B., 7-critical graphs of bounded genus (*Note*) 112 (1993) 279-281
- Mohar, B., A polynomial time circle packing algorithm (*Communication*) 117 (1993) 257-263
- Mollard, M., Interval-regularity does not lead to interval monotonicity (*Communication*) 118 (1993) 233-237
- Monjardet, B., see Chameni Nembua, C. 111 (1993) 105-111
- Moreira, M.L., see Cordovil, R. 111 (1993) 131-136
- Morris, I. and C.D. Wensley, Cycle indices and subgroup lattices 118 (1993) 173-195
- Morvan, M., see Habib, M. 111 (1993) 289-303
- Mullen, G.L., see Dénes, J. 111 (1993) 157-163
- Munuera, C., On MDS elliptic codes (*Note*) 117 (1993) 279-286
- Naiman, D.Q. and H.P. Wynn, A theorem on independence (*Note*) 120 (1993) 287-289
- Newman, I., see Karchmer, M. 114 (1993) 275-282
- Nishii, R., Optimality of experimental designs 116 (1993) 209-225
- Nivat, M. and A. Podelski, Another variation on the common subexpression problem 114 (1993) 379-401
- Nobili, P. and A. Sassano, The anti-join composition and polyhedra 119 (1993) 141-166
- O'Keefe, C.M., T. Penttila and C.E. Praeger, Block-transitive, point-imprimitive designs with  $\lambda = 1$  115 (1993) 231-244
- Ohmori, H., Classification of weighing matrices of order 13 and weight 9 116 (1993) 55-78
- Okamura, H., Paths containing two adjacent edges in  $(2k+1)$ -edge-connected graphs 111 (1993) 401-407
- Olariu, S., Quasi-brittle graphs, a new class of perfectly orderable graphs 113 (1993) 143-153
- Oporowski, B., A decomposition of locally finite graphs 117 (1993) 161-168
- Ostfeld, Z., see Korach, E. 114 (1993) 305-327
- Overmars, M.H., see La Poutré, J.A. 114 (1993) 329-359
- Pach, J., see Erdős, P. 111 (1993) 189-196
- Padberg, M., Lehman's forbidden minor characterization of ideal 0-1 matrices 112 (1993) 409-420
- Palisse, R., A short proof of Fisher's inequality 112 (1993) 421-422
- Pasini, A., Flag-transitive  $C_3$ -geometries 117 (1993) 169-182

- Peled, U.N. and M.K. Srinivasan, Poset matching — a distributive analog of independent matching 114 (1993) 403-424
- Peled, U.N., see Hammer, P.L. 119 (1993) 79- 96
- Penaud, J.-G., see Dulucq, S. 117 (1993) 89-105
- Peng, Y.H., see Chen, C.C. 111 (1993) 113-123
- Penttilä, T., see O'Keefe, C.M. 115 (1993) 231-244
- Pepper, S., see Goulden, I.P. 113 (1993) 263-268
- Peyrat, C., see Bermond, J.-C. 114 (1993) 51- 62
- Pfeiffer, F., see Middendorf, M. 111 (1993) 393-400
- Phelps, K.T. and C.A. Rodger, Nesting partial Steiner triple systems with 2-regular leave graphs 112 (1993) 165-172
- Pluhár, A., see Blázsik, Z. 115 (1993) 51- 55
- Plummer, M.D., see Holton, D.A. 118 (1993) 295-297
- Podelski, A., see Nivat, M. 114 (1993) 379-401
- Poljak, S., On existence theorems 111 (1993) 423-434
- Poljak, S., see Delorme, C. 111 (1993) 145-156
- Praeger, C.E. see O'Keefe, C.M. 115 (1993) 231-244
- Praeger, C.E., see Cameron P.J. 118 (1993) 33- 43
- Priestley, H.A., see Davey, B.A. 113 (1993) 41- 58
- Prodinger, H., How to select a loser 120 (1993) 149-159
- Pröhle, P., see Berman, J.D. 112 (1993) 1- 20
- Przytycka, T., see Bellantoni, S. 114 (1993) 41- 49
- Pyber, L. and Z. Tuza, Menger-type theorems with restrictions on path lengths 120 (1993) 161-174
- Quattrocchi, G. and S. Milici, Repeated blocks in maximum packing of triples with index 2 (*Note*) 115 (1993) 287-291
- Quilliot, A., Une extension du problème du point fixe pour des graphes simples 111 (1993) 435-445
- Quintas, L.V., see Balińska, K.T. 114 (1993) 19- 22
- Rajan, D.S., The equations  $D^k Y = X^*$  in combinatorial species 118 (1993) 197-206
- Rampon, J.-X., see Habib, M. 111 (1993) 289-303
- Rao, M.R., see Conforti, M. 120 (1993) 309
- Rasmussen, C.W., see Lundgren, J.R. 119 (1993) 113-122
- Rasmussen, C.W., see Lundgren, J.R. 119 (1993) 123-139
- Raspaud, A., Postman tours and cycle covers 111 (1993) 447-454
- Reed, B., see Frieze, A. 118 (1993) 69- 74
- Rendl, F. and G. Woeginger, Reconstructing sets of orthogonal line segments in the plane 119 (1993) 167-174
- Research problems 115 (1993) 295-298
- Rifa, J., see Borges, J. 111 (1993) 65- 69
- Rödl, V., see Franek, F. 114 (1993) 199-203



- Rödl, V., see Gould, R.J. 118 (1993) 259-262
- Robertson, J., see McAvaney, K. 113 (1993) 131-142
- Robertson, J.M., see DeTemple, D.W. 113 (1993) 255-258
- Robinson, A.G. and A.J. Goldman, The isolation game for regular graphs 112 (1993) 173-184
- Rodger, C.A., see Lindner, C.C. 117 (1993) 151-159
- Rodger, C.A., see Phelps, K.T. 112 (1993) 165-172
- Rodríguez, J. and A. Satyanarayana, A generalized chromatic polynomial, acyclic orientations with prescribed sources and sinks, and network reliability 112 (1993) 185-197
- Rousseau, C.C., see Erdős, P. 113 (1993) 259-262
- Ruzsa, I.Z., see Erdős, P. 111 (1993) 189-196
- Sánchez-Arroyo, A., see McDiarmid, C.J.H. 111 (1993) 389-392
- Saclé, J.-F., see Favaron, O. 111 (1993) 197-220
- Saidi, S. Codes for perfectly correcting errors of limited size 118 (1993) 207-223
- Sakai, D. and C. Wang, No-hole  $(r+1)$ -distant colorings 119 (1993) 175-189
- Saks, M., see Karchmer, M. 114 (1993) 275-282
- Salveti, M., On the homotopy theory of complexes associated to metrical-hemisphere complexes 113 (1993) 155-177
- Sampathkumar, E., Generalizations of independence and chromatic numbers of a graph 115 (1993) 245-251
- Sander, J.W., On maximal antihierarchic sets of integers 113 (1993) 179-189
- Sanders, R.S., Graphs on which a dihedral group acts edge-transitively 118 (1993) 225-232
- Santha, M. and U.V. Vazirani, Parallel searching of multi-dimensional cubes 114 (1993) 425-433
- Sassano, A., see Nobili, P. 119 (1993) 141-166
- Satyanarayana, A., see Rodríguez, J. 112 (1993) 185-197
- Sauer, N. see Böröczky, K. 115 (1993) 57-63
- Sauer, N., see Hajnal, A. 117 (1993) 113-125
- Scapellato, R., A characterization of bipartite graphs associated with BIB-designs with  $\lambda=1$  (Note) 112 (1993) 283-287
- Schelp, R.H., see Bedrossian, P. 115 (1993) 39-50
- Schiermeyer, I., Computation of the 0-dual closure for hamiltonian graphs 111 (1993) 455-464
- Schmerl, J.H. and W.T. Trotter, Critically indecomposable partially ordered sets, graphs, tournaments and other binary relational structures 113 (1993) 191-205
- Schwärzler, W. and A. Sebő, A generalized cut-condition for multiflows in matroids 113 (1993) 207-221
- Sebő, A., see Schwärzler, W. 113 (1993) 207-221
- Seifter, N., On the girth of infinite graphs (Note) 118 (1993) 279-287



Sendrier, N., see Chabanne, H.	112 (1993)	245-248
Serra, O., see Gómez, J.	114 (1993)	219-235
Seyffarth, K., Packings and perfect path double covers of maximal planar graphs	117 (1993)	183-195
Seyffarth, K., see Hell, P.	111 (1993)	313-322
Shader, B.L., On biclique partitions of the complete graph	117 (1993)	197-213
Shamir, E., see Levy, R.	114 (1993)	361-365
Shamir, R., A fast algorithm for constructing Monge sequences in transportation problems with forbidden arcs	114 (1993)	435-444
Sharary, A.H. and N. Zaguia, Minimizing the number of tardy jobs in single machine sequencing	117 (1993)	215-223
Shee, S.-C. and Y.-S. Ho, The cordiality of one-point union of $n$ copies of a graph	117 (1993)	225-243
Sheehan, J., see Clapham C.R.J.	120 (1993)	253-259
Shirakura, T., Fractional factorial designs of two and three levels	116 (1993)	99-135
Simons, J., Permutation groups on unordered sets II; On a theorem of Frucht ( <i>Note</i> )	118 (1993)	275-278
Simpson, J.E., A bipartite Erdős-Ko-Rado theorem ( <i>Note</i> )	113 (1993)	277-280
Simpson, R.J., see Eggleton, R.B.	111 (1993)	165-178
Solé, P., see García, C.	111 (1993)	257-261
Solot, P., see Mahadev, N.V.R.	111 (1993)	361-366
Soria, M., see Flajolet, P.	114 (1993)	159-180
Sridharan, S., On the Berge's strong path partition conjecture ( <i>Note</i> )	112 (1993)	289-293
Sridharan, S., On the strong path partition conjecture of Berge ( <i>Communication</i> )	117 (1993)	265-270
Srinivasan, M.K., see Peled U.N.	114 (1993)	403-424
Stanley, R.P., A combinatorial decomposition of acyclic simplicial complexes	120 (1993)	175-182
Stanley, R.P., see Chen, W.Y.C.	115 (1993)	65- 75
Steger, A. and M. Yu, On induced matchings ( <i>Note</i> )	120 (1993)	291-295
Su, J., On locally $k$ -critically $n$ -connected graphs	120 (1993)	183-190
Sun, X.-H., On Rota's problem of the explicit representation for umbral operators ( <i>Note</i> )	120 (1993)	297-300
Sutinuntopas, S., see Brand, N.	120 (1993)	25- 35
Swart, H.C., see Henning, M.A.	120 (1993)	93-105
Szendrei, A., see Berman, J.D.	112 (1993)	1- 20
Tamari, F., A construction of some $[n, k, d; q]$ -codes meeting the Griesmer bound	116 (1993)	269-287
Thuillier, H., see Fouquet, J.L.	114 (1993)	181-198

- Topp, J. and L. Volkmann, Some upper bounds for the product of the domination number and the chromatic number of a graph (*Note*) 118 (1993) 289-292
- Triesch, E., see Althöfer, I. 115 (1993) 1- 9
- Trotter, W.T., see Schmerl, J.H. 113 (1993) 191-205
- Tuza, Z., Multipartite Turán problem for connected graphs and hypergraphs 112 (1993) 199-206
- Tuza, Z., see Bacsó, G. 111 (1993) 40- 43
- Tuza, Z., see Blázsik, Z. 115 (1993) 51- 55
- Tuza, Z., see Caro, Y. 111 (1993) 87- 93
- Tuza, Z., see Pyber, L. 120 (1993) 161-174
- Tverberg, H., On a coin tossing problem by G. Bennett (*Note*) 115 (1993) 293-294
- Urabe, M., see Akiyama, J. 116 (1993) 291-298
- Ushio, K.,  $G$ -designs and related designs 116 (1993) 299-311
- van Leeuwen J., see La Poutré, J.A. 114 (1993) 329-359
- Valdés, L., On the divisibility of the cycle number by 7 (*Note*) 120 (1993) 301-305
- Vanstone, S.A., see Lamken, E.R. 120 (1993) 135-148
- Varadarajan, K., see Breckenridge, J.W. 120 (1993) 37- 50
- Vazirani, U.V., see Santha, M. 114 (1993) 425-433
- Vilarem, M.-C., see P. Jégou 111 (1993) 333-344
- Voigt, M., List colourings of planar graphs (*Communication*) 120 (1993) 215-219
- Volkmann, L., see Topp, J. 118 (1993) 289-292
- Wagowski, M., Coordinatization of  $B$ -matroids 111 (1993) 465-479
- Wallis, W.D. and G.-H. Zhang, On the partition and coloring of a graph by cliques 120 (1993) 191-203
- Wang, C., see Sakai, D. 119 (1993) 175-189
- Wang, C.-D., On the harmoniousness of dicyclic groups (*Communication*) 120 (1993) 221-225
- Wang, H.,  $P_{2r}$ -factorization of a complete bipartite graph (*Note*) 120 (1993) 307-308
- Wang, H., Partition of a bipartite graph into cycles (*Note*) 117 (1993) 287-291
- Wang, J., see Alavi, Y. 111 (1993) 3- 10
- Wang, J., see Chen, C. 112 (1993) 29- 40
- Watson, S., see Brown, J.I. 113 (1993) 27- 39
- Wehrhahn, K.H., see Breckenridge, J.W. 120 (1993) 37- 50
- Wei, W., see Gao, S. 112 (1993) 93-102
- Wensley, C.D., see Morris, I. 118 (1993) 173-195
- Wenzel, W., Pfaffian forms and  $\Delta$ -matroids 115 (1993) 253-266
- West, D.B., see Kratzke, T.M. 118 (1993) 145-156

Whitesides, S., see Bellantoni, S.	114 (1993)	41- 49
Wigderson, A., see Karchmer, M.	114 (1993)	275-282
Wild, M., Cover preserving embedding of modular lattices into partition lattices	112 (1993)	207-244
Woeginger, G., see Rendl, F.	119 (1993)	167-174
Wojda, A.P., see Benhocine, A.	118 (1993)	11- 21
Wu, S., see Yin, J.	113 (1993)	281-284
Wynn, H.P., see Naiman, D.Q.	120 (1993)	287-289
 Xu, S., Chromaticity of a family of $k_4$ -homeomorphs ( <i>Note</i> )	117 (1993)	293-297
 Yamasaki, Y., Shannon-like games are difficult	111 (1993)	481-483
Yin, J. and S. Wu, Four new BIBDs with block size seven ( <i>Note</i> )	113 (1993)	281-284
Yin, J., see Bennett, F.E.	113 (1993)	7- 25
Ytrehus, Ø., see Hamada, N.	115 (1993)	175-185
Yu, M., see Steger, A.	120 (1993)	291-295
 Zaguia, N., see Sharary, A.H.	117 (1993)	215-223
Zaslavsky, T., The projective-planar signed graphs	113 (1993)	223-247
Zemor, G., see Cohen, G.D.	114 (1993)	105-113
Zhang, C.-Q., see Alspach, B.	111 (1993)	11- 17
Zhang, G.-H., see Wallis, W.D.	120 (1993)	191-203
Zhou, H., Chromatic difference sequences and homomor- phisms ( <i>Note</i> )	113 (1993)	285-292
Zhou, H., Inequalities with respect to graph homomor- phism ( <i>Note</i> )	112 (1993)	295-298
Zhu, L., see Bennett, F.E.	113 (1993)	7- 25
Zhu, X., see Böröczky, K.	115 (1993)	57- 63



# PARALLEL COMPUTING

Editors-in-Chief: **U. Schendel**,  
(Managing Editor) Institut für  
Mathematik I, Freie Universität  
Berlin, Arnimallee 2-6, 1000  
Berlin 33, Germany  
**G.R. Joubert**, Aquariuslaan 60,  
5632 BD Eindhoven, The  
Netherlands

Assistant Editor: **W. Rönsch**,  
IBM Scientific Center, P.O. Box  
10 30 68, 6900 Heidelberg,  
Germany

Regional Editor for North, Central  
and South America:  
**R. Hiromoto**, Computing and  
Communication Division, Los  
Alamos National Laboratory, Mail  
Stop B-265, Los Alamos, NM  
87545, USA

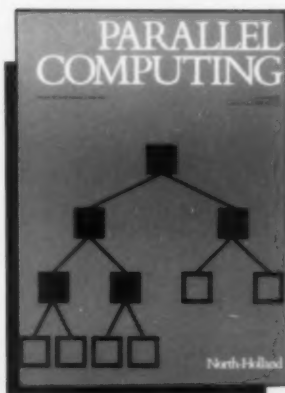
Regional Editor for the Far East:  
**Y. Oyanagi**, University of Tokyo,  
Department of Information  
Science, Hongo 7-3-1,  
Bunkyo-ku, Tokyo 113, Japan

## AIMS AND SCOPE

**Parallel Computing** is an  
international journal presenting the  
theory and use of parallel computer  
systems, including vector, pipeline,  
array and fifth generation  
computers. Within this context the  
journal covers all aspects of  
high-speed computing.

**Parallel Computing** features  
original research work, tutorial and  
review articles as well as accounts  
of practical experience with (and  
techniques for) the use of parallel  
computers. Contributions can cover:

- Algorithm design for all types  
of parallel computers
- All aspects of the application  
of parallel computers,  
including industrial  
applications such as CAD/CAM
- The impact of high-speed  
computation on current  
research, as well as the  
advancement of knowledge
- 



- Software engineering aspects  
relating to parallel computing
- Software for parallel computer  
systems including  
programming languages,  
operating systems, utilities,  
libraries, etc.
- Networking technology for  
support of high-speed  
computing via centralised file  
servers, output servers,  
interactive access
- Taxonomy, models and  
architectural trends of parallel  
processing
- General hardware  
(architecture) concepts, new  
technologies enabling the  
realisation of such new  
concepts as well as details of  
commercially available systems
- Performance measurement  
results on state-of-the-art  
systems
- Peripheral devices for parallel  
(super-) computers.

**ABSTRACTED/INDEXED IN:**  
Cambridge Scientific Abstracts,  
Computer Abstracts, Current  
Contents: Engineering, Technology  
Applied Science, Engineering  
Index/Compendex, INSPEC  
Information Services, Mathematical  
Reviews.

1994 Volume 20  
(in 12 issues)  
Dfl. 1422.00 (US \$ 769.00)  
incl. Postage  
ISSN 0167-8191

Dutch Guilder prices quoted apply  
worldwide, except in the Americas  
(North, Central and South  
America). US \$ prices quoted apply  
in the Americas only. Customers in  
the European Community should  
add the appropriate VAT rate  
applicable in their country to the  
price.

Send this form (or a photocopy) to:  
ELSEVIER SCIENCE PUBLISHERS  
attn: Marijke Haccou  
P.O. Box 103  
1000 AC Amsterdam  
The Netherlands

In the USA/Canada:  
attn: Judy Weislogel  
P.O. Box 945  
Madison Square Station  
New York, NY 10160-0757

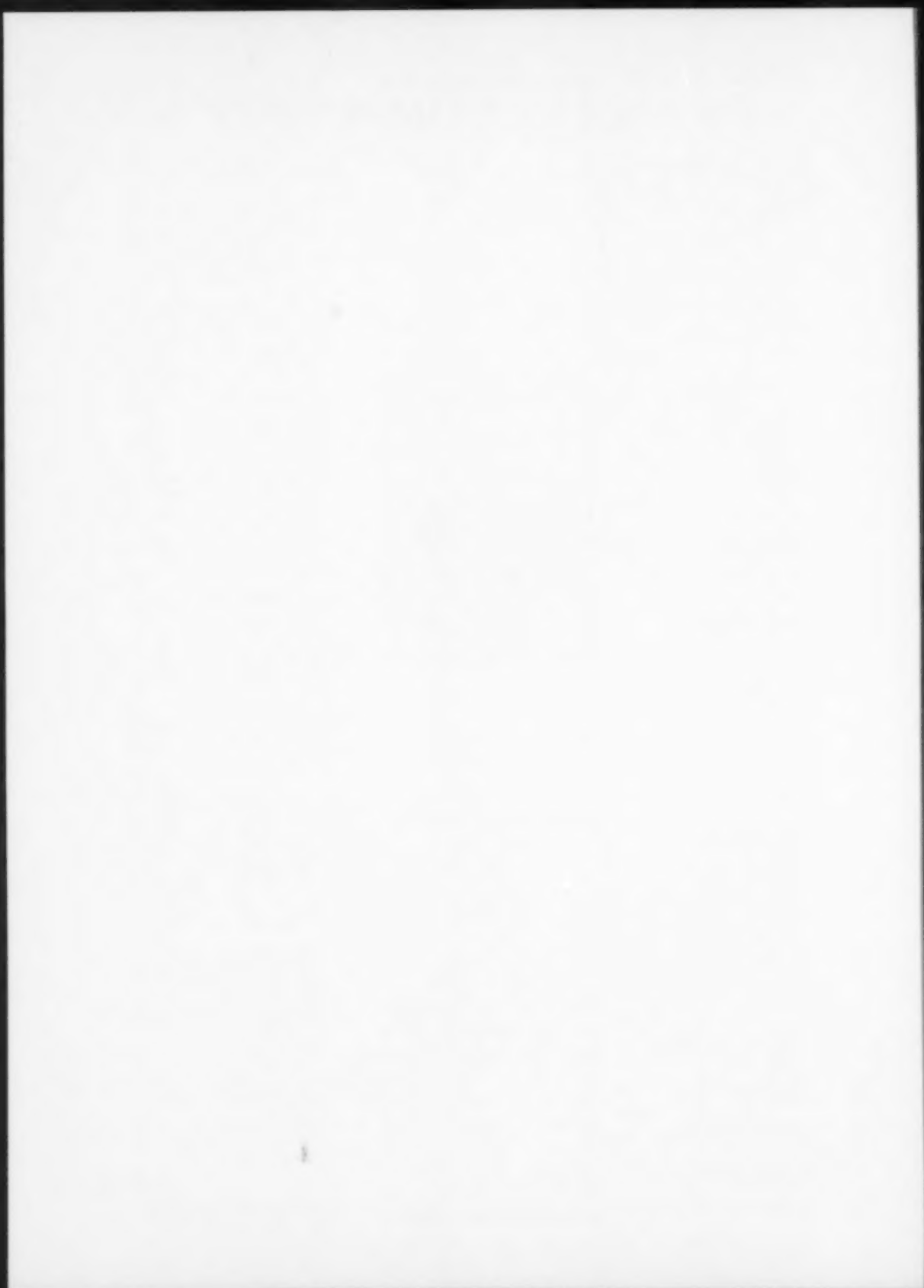
## PARALLEL COMPUTING

Please send an inspection copy of this journal to:

Name \_\_\_\_\_

Address \_\_\_\_\_

Country \_\_\_\_\_



## Scope of the Journal

The aim of this journal is to bring together research papers in different areas of discrete mathematics. Contributions presented to the journal can be research papers, short notes, surveys, and possibly research problems. The 'Communications' section will be devoted to the fastest possible publication of the brief outlines of recent research results, the detailed presentation of which might be submitted for possible publication in DISC or elsewhere. The journal will also publish a limited number of book announcements, as well as proceedings of conferences. The journal will publish papers in combinatorial mathematics and related areas. In particular, graph and hypergraph theory, network theory, coding theory, block designs, lattice theory, the theory of partially ordered sets, combinatorial geometries, matroid theory, extremal set theory, logic and automata, matrices, polyhedra, discrete probability theory, etc. shall be among the fields covered by the journal.

## Instructions to contributors

All contributions should be written in English or French, should have an abstract in English (as well as one in French if the paper is written in French), and—with the exception of Communications—should be sent in triplicate to Nelly Segal, Publications Assistant, RUTCOR, Rutgers University Center for Operations Research, P.O. Box 5062, New Brunswick, NJ 08903-5062, USA. The authors are requested to put their mailing address on the manuscript.

Upon acceptance of an article, the author(s) will be asked to transfer copyright of the article to the Publisher. This transfer will ensure the widest possible dissemination of information.

Manuscripts submitted for the Communications section, having at most 5 typewritten pages, should be sent to a member of the editorial board in triplicate. Detailed proofs do not have to be included, but results must be accompanied at least by rough outlines of their proofs. Subsequent publication in this journal or elsewhere of the full text of a research report, the outline of which has been published in the Communications section of our journal, is not excluded. Every effort shall be made for the fastest possible publication of Communications. Therefore all proofreading will be done by the Publisher's staff and no proofs will be sent to authors. Consequently the presentation of these manuscripts should be very clear. No page charge is made.

Please make sure that the paper is submitted in its final form. Corrections in the proofstage, other than of printer's errors, should be avoided; costs arising from such extra corrections will be charged to the authors. The manuscript should be prepared for publication in accordance with instructions given in the 'Instructions to Authors' (available from the Publisher) details of which are condensed below:

1. The manuscript must be typed on one side of the paper in double spacing with wide margins. A duplicate copy should be retained by the author.
2. All mathematical symbols which are not typewritten should be listed separately.
3. Footnotes, which should be kept to a minimum and should be brief, must be numbered consecutively and typed on a separate sheet in the same format as the main text.
4. Special care should be given to the preparation of the drawings for figures and diagrams. Except for a reduction in size, they will appear in the final printing in exactly the same form as they were submitted by the author; normally they will not be redrawn by the printer. In order to make a photographic reproduction possible, all drawings should be on separate sheets, with wide margins, drawn large size, in Indian ink, and carefully lettered. Exceptions are diagrams only containing formulae and a small number of single straight lines (or arrows); these can be typeset by the printer.
5. References should be listed alphabetically, in the same way as the following examples:  
*For a book:* W.K. Chen, *Applied Graph Theory* (North-Holland, Amsterdam, 1971).  
*For a paper in a journal:* J. Rhodes and B.R. Tilson, Lower bounds for complexity of finite semigroups, *J. Pure Appl. Algebra* 1 (1971) 79–95.  
*For a paper in a contributed volume:* M.O. Rabin, Weakly definable relations and special automata, in: Y. Bar-Hillel, ed., *Mathematical Logic and Foundations of Set Theory* (North-Holland, Amsterdam, 1970) 1–23.  
*For an unpublished paper:* D. Allen, Relations between the local and global structure of finite semigroups, Ph.D. Thesis, University of California, Berkeley, CA, 1968.

## Author's benefits

1. 30% discount on all book publications of North-Holland.
2. 50 reprints are provided free of charge to the principal author of each paper published.

*US mailing notice*—*Discrete Mathematics* (0012-365x) is published monthly with one additional issue in January (total 13 issues) by Elsevier Science Publishers (Molenwerf 1, Postbus 211, 1000 AE Amsterdam). Annual subscription price in the USA US\$ 2185.00 (US\$ price valid in North, Central and South America only), including air speed delivery. Application to mail at second class postage rate is pending at Jamaica, NY 11431.

**USA POSTMASTERS:** Send address changes to *Discrete Mathematics*, Publication Expediting, Inc., 200 Meacham Avenue, Elmont, NY 11003. Air freight and mailing in the USA by Publication Expediting.

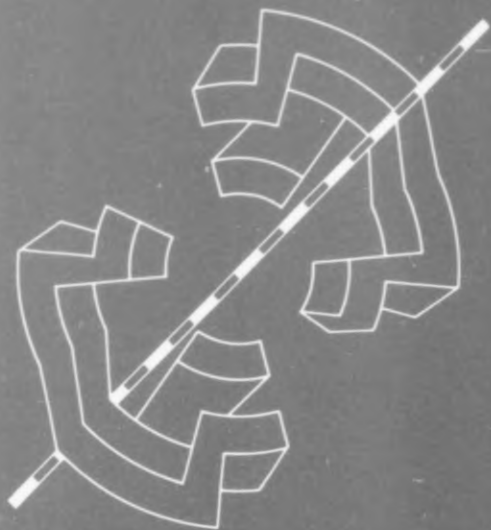


0012-365X(1993)111/120;1-G



ISSN 0012-365X

# DISCRETE MATHEMATICS



MASTER INDEX  
VOLUMES 121-130

NORTH-HOLLAND

## DISCRETE MATHEMATICS

**Editor-in-Chief** Peter L. Hammer, New Brunswick (NJ)

### Advisory Editors

C. Berge, Paris  
P. Erdős, Budapest  
M.A. Harrison, Berkeley (CA)

A.J. Hoffman,  
Yorktown Heights (NY)  
V.L. Klee, Seattle (WA)  
R.C. Mullin, Waterloo

G.-C. Rota, Cambridge (MA)  
V.T. Sós-Turán, Budapest  
J.H. van Lint, Eindhoven

### Board of Editors

M.S. Aigner, Berlin  
B. Alspach, Burnaby  
G.E. Andrews, Univ. Park (PA)  
A. Barlotti, Firenze  
C. Benzaken, Grenoble  
J.-C. Bermond,  
Sophia-Antipolis  
N.L. Biggs, London  
B. Bollobás, Cambridge (UK)  
R.A. Brualdi, Madison (WI)  
T.H. Brylawski,  
Chapel Hill (NC)  
P.J. Cameron, London  
P. Camion, Le Chesnay  
G. Chartrand, Kalamazoo (MI)  
V. Chvátal, New Brunswick (NJ)

J. Doyen, Brussels  
D. Foata, Strasbourg  
A.S. Fraenkel, Rehovot  
P. Frankl, Murray Hill (NJ)  
A.M. Frieze, Pittsburgh (PA)  
I.M. Gessel, Waltham (MA)  
R.L. Graham,  
Murray Hill (NJ)  
A. Hajnal, Budapest  
F. Harary, Las Cruces (NM)  
D.M. Jackson, Waterloo  
J. Kahn, New Brunswick (NJ)  
G.O.H. Katona, Budapest  
D.J. Kleitman,  
Cambridge (MA)  
L. Lovász, New Haven (CT)

E.C. Milner, Calgary  
I. Rival, Ottawa  
A. Rosa, Hamilton  
S. Rudeanu, Bucharest  
G. Sabidussi, Montreal  
H. Sachs, Ilmenau  
J. Schonheim, Tel-Aviv  
M.P. Schützenberger, Paris  
J.H. Spencer, New York (NY)  
C. Thomassen, Lyngby  
W.T. Tutte, Waterloo  
D.J.A. Welsh, Oxford  
R. Wille, Darmstadt  
D.R. Woodall, Nottingham

**Editorial Manager** Nelly Segal **Desk Editor** Mick van Gijlswijk

**Publication Information.** Discrete Mathematics (ISSN 0012-365X). For 1994 volumes 121–133 are scheduled for publication. A combined subscription to Discrete Mathematics and Discrete Applied Mathematics (Vols. 48–55) at reduced rate is available. Subscription prices are available upon request from the Publisher. Subscriptions are accepted on a prepaid basis only and are entered on a calendar year basis. Issues are sent by surface mail except to the following countries where air delivery via SAL is ensured: Argentina, Australia, Brazil, Canada, Hong Kong, India, Israel, Japan, Malaysia, Mexico, New Zealand, Pakistan, China, Singapore, South Africa, South Korea, Taiwan, Thailand, USA. For all other countries airmail rates are available upon request. Claims for missing issues must be made within six months of our publication (mailing) date. Please address all your requests regarding orders and subscription queries to: Elsevier Science, Journal Department, P.O. Box 211, 1000 AE Amsterdam, Netherlands. Tel.: 31-20-5803642, fax: 31-20-5803598.

© 1994, Elsevier Science B.V. (North-Holland)

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the Publisher, Elsevier Science B.V., Copyright and Permissions Department, P.O. Box 521, 1000 AM Amsterdam, Netherlands.

*Special regulations for authors*—Upon acceptance of an article by the journal, the author(s) will be asked to transfer copyright of the article to the Publisher. This transfer will ensure the widest possible dissemination of information.

*Special regulations for readers in the USA*—This journal has been registered with the Copyright Clearance Center, Inc. Consent is given for copying of articles for personal or internal use, or for the personal use of specific clients. This consent is given on the condition that the copier pays through the Center the per-copy fee stated in the code on the first page of each article for copying beyond that permitted by Sections 107 or 108 of the US Copyright Law. The appropriate fee should be forwarded with a copy of the first page of the article to the Copyright Clearance Center, Inc., 27 Congress Street, Salem, MA 01970, USA. If no code appears in an article, the author has not given broad consent to copy and permission to copy must be obtained directly from the author. The fee indicated on the first page of an article in this issue will apply retroactively to all articles published in the journal, regardless of the year of publication. This consent does not extend to other kinds of copying such as for general distribution, resale, advertising and promotion purposes, or for creating new collective works. Special written permission must be obtained from the Publisher for such copying.

No responsibility is assumed by the Publisher for any injury and/or damage to persons or property as a matter of products liability, negligence or otherwise, or from any use or operation of any methods, products, instructions or ideas contained in the material herein. Although all advertising material is expected to conform to ethical standards, inclusion in this publication does not constitute a guarantee or endorsement of the quality or value of such product or of the claims made of it by its manufacturer.

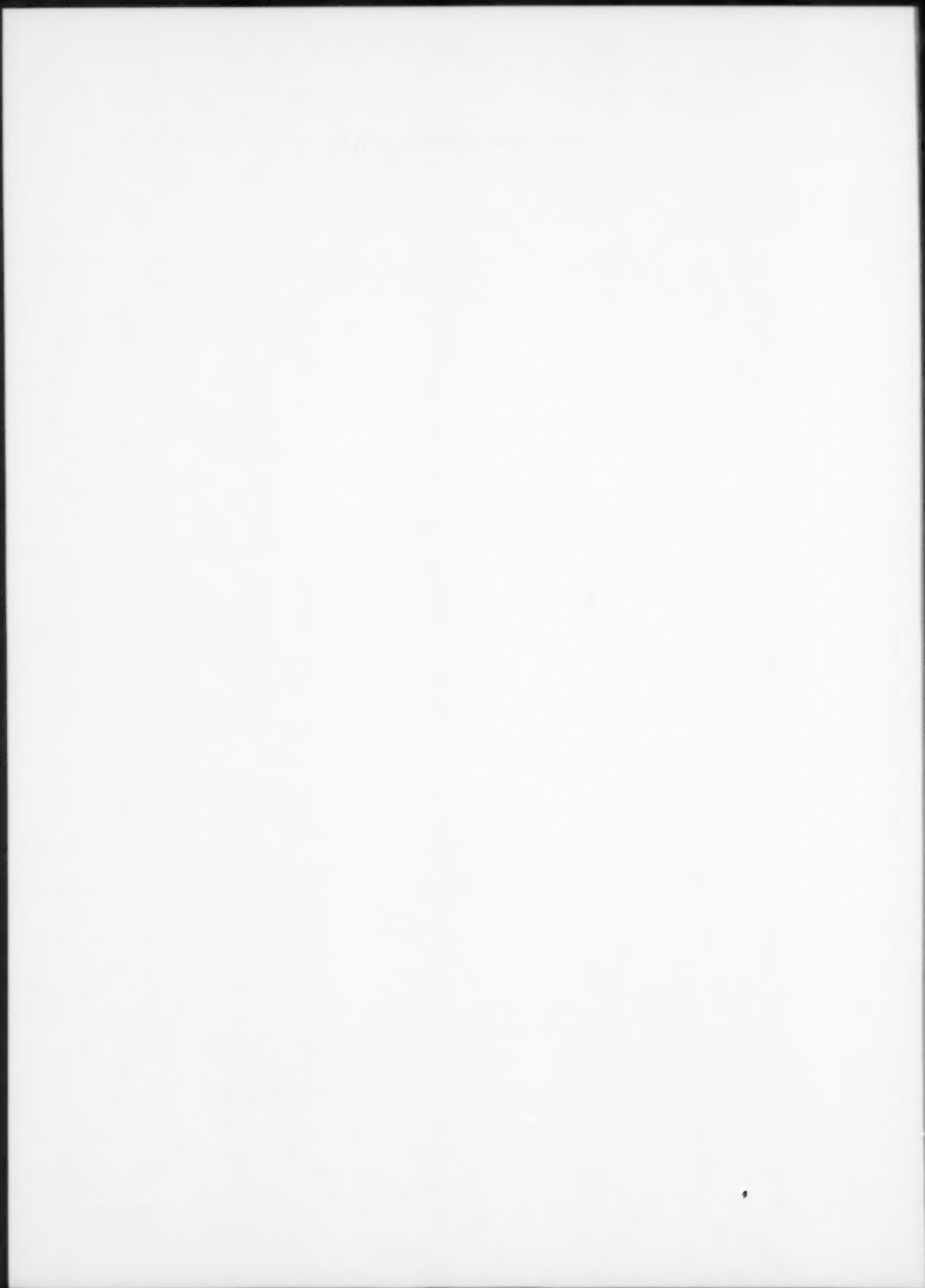
© The paper used in this publication meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper)

Published monthly

0012-365X/94/\$07.00

Printed in the Netherlands

## DISCRETE MATHEMATICS



# DISCRETE MATHEMATICS

MASTER INDEX  
VOLUMES 121-130



ELSEVIER, Amsterdam-Lausanne-New York-Oxford-Shannon-Tokyo

Abstracted/Indexed in: ACM Computing Reviews, Cambridge Scientific Abstracts, Current Contents: Physical, Chemical & Earth Sciences, International Abstracts in Operations Research, Mathematical Reviews, PASCAL, Science Citation Index, Zentralblatt für Mathematik.

© 1994, Elsevier Science B.V. All rights reserved

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the Publisher, Elsevier Science B.V., Copyright and Permissions Department, P.O. Box 521, 1000 AM Amsterdam, Netherlands.

*Special regulations for authors*—Upon acceptance of an article by the journal, the author(s) will be asked to transfer copyright of the article to the Publisher. This transfer will ensure the widest possible dissemination of information.

*Special regulations for readers in the USA*—This journal has been registered with the Copyright Clearance Center, Inc. Consent is given for copying of articles for personal or internal use, or for the personal use of specific clients. This consent is given on the condition that the copier pays through the Center the per-copy fee stated in the code on the first page of each article for copying beyond that permitted by Sections 107 or 108 of the US Copyright Law. The appropriate fee should be forwarded with a copy of the first page of the article to the Copyright Clearance Center, Inc., 27 Congress Street, Salem, MA 01970, USA. If no code appears in an article, the author has not given broad consent to copy and permission to copy must be obtained directly from the author. The fee indicated on the first page of an article in this issue will apply retroactively to all articles published in the journal, regardless of the year of publication. This consent does not extend to other kinds of copying such as for general distribution, resale, advertising and promotion purposes, or for creating new collective works. Special written permission must be obtained from the Publisher for such copying.

0012-365X/94/\$07.00

No responsibility is assumed by the Publisher for any injury and/or damage to persons or property as a matter of products liability, negligence or otherwise, or from any use or operation of any methods, products, instructions or ideas contained in the material herein.

Although all advertising material is expected to conform to ethical standards, inclusion in this publication does not constitute a guarantee or endorsement of the quality or value of such product or of the claims made of it by its manufacturer.

This journal is printed on acid-free paper.  
Printed in the Netherlands.

## **EDITOR-IN-CHIEF**

Peter L. Hammer, *RUTCOR, Rutgers University Center for Operations Research,  
P.O. Box 5062, New Brunswick, NJ 08903-5062, USA*

## **ADVISORY EDITORS**

- C. Berge, *E.R. Combinatoire, Centre de Mathématique Sociale, 54 Boulevard Raspail,  
75270 Paris Cedex 06, France*
- P. Erdős, *Mathematical Institute, Hungarian Academy of Sciences, Reáltanoda u.  
13-15, H-1053 Budapest, Hungary*
- M.A. Harrison, *Computer Science Division, University of California, Berkeley, CA  
94720, USA*
- A.J. Hoffman, *IBM Thomas Watson Research Center, Mathematical Sciences  
Department, P.O. Box 218, Yorktown Heights, NY 10598, USA*
- V.L. Klee, *Department of Mathematics, University of Washington, Seattle, WA 98195,  
USA*
- R.C. Mullin, *Department of Combinatorics & Optimization, University of Waterloo,  
Waterloo, Ont., Canada N2L 3G1*
- G.-C. Rota, *Department of Mathematics, Massachusetts Institute of Technology,  
Cambridge, MA 02139, USA*
- V.T. Sós-Turán, *Elke TTK Analízis I, Mathematical Institute, Múzeum Krt. 6-8,  
H-Budapest 8, Hungary*
- J.H. van Lint, *Technische Universiteit, Enschede, 7500 LB Enschede,  
Netherlands*

## **BOARD OF EDITORS**

- M.S. Aigner, *FB Mathematik, WE2, Freie Universität Berlin, Arnimallee 3, 14195  
Berlin 33, Germany*
- B. Alspach, *Department of Mathematics & Statistics, Simon Fraser University,  
Burnaby, B.C., Canada V5A 1S6*
- G.E. Andrews, *Department of Mathematics & Statistics, Pennsylvania State Univer-  
sity, University Park, PA 16802, USA*
- A. Barlotti, *Istituto Matematico "Ulisse Dini", Viale Morgagni 67/A, I-50134 Firenze,  
Italy*
- C. Benzaken, *Institute of Advanced Mathematics, Scientific and Medical, University of  
Grenoble, BP 53X, 38041 Grenoble Cedex, France*
- J.-C. Bermond, *Informatique, CNRS, URA 1376, 3 rue Einstein, Sophia-Antipolis,  
06560 Valbonne, France*
- N.L. Biggs, *Department of Mathematics, London School of Economics, Houghton  
Street, London WC2A 2AE, UK*
- B. Bollobás, *Department of Pure Mathematics & Mathematical Statistics, University of  
Cambridge, 16 Mill Lane, Cambridge CB2 1SB, UK*
- R.A. Brualdi, *Department of Mathematics, University of Wisconsin-Madison, 480  
Lincoln Drive, Madison, WI 53706, USA*
- T.H. Brylawski, *Department of Mathematics, University of North Carolina, Chapel  
Hill, NC 27514, USA*

- P.J. Cameron, *School of Mathematical Sciences, Queen Mary College, University of London, Mile End Road, London E1 4NS, UK*
- P. Camion, *INRIA, Domaine de Voluceau-Rocquencourt, BP 105, Le Chesnay Cedex 78153, France*
- G. Chartrand, *Department of Mathematics, Western Michigan University, Kalamazoo, MI 49008, USA*
- V. Chvátal, *Department of Computer Science, Rutgers University, New Brunswick, NJ 08903, USA*
- J. Doyen, *Département de Mathématiques, Université de Bruxelles, Campus Plaine CP 216, Bd. du Triomphe, B-1050 Bruxelles, Belgium*
- D. Foata, *Département Mathématique, Université Louis Pasteur, 7 rue René Descartes, F-67084 Strasbourg, France*
- A.S. Fraenkel, *Department of Applied Mathematics, Weizmann Institute of Science, IL-76100 Rehovot, Israel*
- P. Frankl, *AT&T Bell Laboratories, 600 Mountain Avenue, Room 6E-206, Murray Hill, NJ 07974, USA*
- A.M. Frieze, *Department of Mathematics, Carnegie Mellon University, Pittsburgh, PA 15213, USA*
- I.M. Gessel, *Department of Mathematics, Brandeis University, P.O. Box 9110, Waltham, MA 02254-9110, USA*
- R.L. Graham, *AT&T Bell Laboratories, 600 Mountain Avenue, Room 2C-382, Murray Hill, NJ 07974, USA*
- A. Hajnal, *Mathematical Institute, Hungarian Academy of Science, Reáltanoda u. 13-15, H-1053 Budapest, Hungary*
- F. Harary, *Department of Computer Science, New Mexico State University, Las Cruces, NM 88003, USA*
- D.M. Jackson, *Combinatorics & Optimization, University of Waterloo, Waterloo, Ont., Canada N2L 3G1*
- J. Kahn, *Department of Mathematics, Rutgers University, Hill Center, Busch Campus, New Brunswick, NJ 08903, USA*
- G.O.H. Katona, *Matematik Kutató Intézet, Magyar Tudományos Akadémia, Reáltanoda u. 13-15, H-1053 Budapest, Hungary*
- D.J. Kleitman, *Department of Mathematics, Massachusetts Institute of Technology, Cambridge, MA 02139, USA*
- L. Lovász, *Yale University, Department of Computer Science, New Haven, CT 06520, USA*
- E.C. Milner, *Department of Mathematics, University of Calgary, Calgary, Alta., Canada T2N 1N4*
- I. Rival, *Department of Computer Science, University of Ottawa, Ottawa, Ont., Canada K1N 6N5*
- A. Rosa, *Department of Mathematics, McMaster University, Hamilton, Ont., Canada L8S 4K1*
- S. Rudeanu, *Institute of Mathematics, University of Bucharest, Str. Academiei 14, 70109 Bucuresti, Romania*
- G. Sabidussi, *Département de mathématiques et statistique, Université de Montréal, C.P. 6128 Succursale A, Montréal, Qué., Canada H3C 3J7*



- H. Sachs, *TH/Sekt. Mathematik, Rechentechnik und Kybernetik, Postfach 327, 98693 Ilmenau, Germany*
- J. Schonheim, *Department of Mathematics, Tel Aviv University, Ramat Aviv, IL-Tel Aviv, Israel*
- M.P. Schützenberger, *U.E.R. Mathématique, Université de Paris VII, 2, place Jussieu, F-75251 Paris Cedex 5, France*
- J.H. Spencer, *The Courant Institute, New York University, 251 Mercer Street, New York, NY 10012, USA*
- C. Thomassen, *Mathematical Institute, Technical University of Denmark, Building 303, DK-2800 Lyngby, Denmark*
- W.T. Tutte, *Department of Combinatorics & Optimization, University of Waterloo, Waterloo, Ont., Canada N2L 3G1*
- D.J.A. Welsh, *Mathematical Institute, University of Oxford, 24-29 St. Giles, Oxford OX1 3LB, UK*
- R. Wille, *Fachbereich Mathematik, Technische Hochschule Darmstadt, Schlossgartenstrasse 7, 64289 Darmstadt, Germany*
- D.R. Woodall, *Department of Mathematics, University of Nottingham, University Park, Nottingham NG7 2RD, UK*



## List of referees: volumes 121-130

DISCRETE MATHEMATICS has continuously benefitted from the kind assistance of a great number of referees. We hereby express our gratitude for their sustained efforts, without which our activity could not have been carried out.

the editors

R. Aharoni  
M. Aigner  
M.O. Albertson  
N. Alon  
B. Alspach  
T. Andreae  
G.E. Andrews  
S.R. Arikati  
A.M. Assaf  
D. Avis

A. Bachem  
M.L. Balinski  
W. Banaszczyk  
H.-J. Bandelt  
J. Bang-Jensen  
I. Barany  
C.A. Barefoot  
A. Barlotti  
J. Beck  
G. Behrendt  
L.W. Beineke  
E.A. Bender  
F.E. Bennett  
G. Bennett  
M.K. Bennett  
C. Benzaken  
C. Berge  
K.A. Berman  
D. Bienstock  
A. Björner  
J.L. Blanchard  
M. Blidia  
A. Blokhuis  
K.P. Bogart  
J.A. Bondy  
J. Bonin  
A. Bouchet

A. Brandstadt  
F. Brenti  
H.J. Broersma  
A. Brøndsted  
A.E. Brouwer  
R.A. Brualdi  
A.C. Burris

P. Camion  
S.R. Campbell  
E.R. Canfield  
Y. Caro  
P.A. Catlin  
H. Chabanne  
M. Chari  
P. Charpin  
G. Chartrand  
P.Z. Chinn  
F.R.K. Chung  
V. Chvátal  
R. Cignoli  
E.J. Cockayne  
C.J. Colbourn  
M. Conforti  
D.G. Corneil  
R.W. Craigen  
Y. Crama  
L. Cummings

P. Damaschke  
C. Delorme  
P. Delsarte  
G. Ding  
A.W.M. Dress  
D.Z. Du  
G. Duchamp  
R.M. Dudley  
D. Duffus

K. Engel  
R.C. Entringer  
H. Everett

U. Faigle  
S. Fajtlowicz  
R.J. Faudree  
O. Favaron  
G. Fejes-Toth  
M.R. Fellows  
S. Felsner  
M.A. Fiol  
S. Fiorini  
P.C. Fishburn  
D. Foata  
E.W. Formanek  
A.S. Fraenkel  
A. Frank  
A.M. Frieze  
H.-L. Fu  
S. Fujishige  
Z. Füredi

J.A. Gallian  
F. Gavril  
I. Gessel  
C.D. Godsil  
D.L. Goldsmith  
M.C. Golumbic  
P. Goossens  
R.J. Gould  
D.A. Grable  
R.L. Graham  
G. Grätzer  
J.R. Griggs  
P. Gritzmann  
J.L. Gross  
B. Grünbaum

- D.R. Guichard  
 V.A. Gurvich  
 R.K. Guy  
 A. Gyarfas  
 E. Gyori
- G. Hahn  
 Y.O. Hamidoune  
 E.O. Hare  
 Y.H. Harris Kwong  
 A. Hartman  
 B.L. Hartnell  
 R. Hassin  
 R.B. Hayward  
 S.T. Hedetniemi  
 K. Heinrich  
 R.L. Hemminger  
 A. Hertz  
 A.J.W. Hilton  
 C.T. Hoang  
 A.M. Hobbs  
 W. Hochstattler  
 K.W. Hoke  
 R. Holzman  
 A. Huck  
 F.K. Hwang
- T. Ibaraki  
 G. Isaak  
 A. Itai  
 L. Iturrioz
- B.W. Jackson  
 P.G. Jeavons  
 S. Jendrol  
 D.S. Johnson  
 M. Johnson  
 H.A. Jung  
 D. Jungnickel
- S. Kageyama  
 J. Kahn  
 M. Kano  
 D. Kelly  
 L.M. Kelly  
 A.K. Kelmans  
 L. Khachiyan  
 H. Kharaghani  
 A. Khelladi  
 V. Klee  
 D.J. Kleitman  
 A. Knopfmacher  
 H. Koch  
 G. Koester  
 A. Kogan
- Y. Kohayakawa  
 W. Kuhnel  
 Y.S. Kupitz  
 J.H. Kwak
- G. Lachaud  
 J.C. Lagarias  
 C.W.H. Lam  
 S. Landau  
 H. Laue  
 J. Lauri  
 I. Leader  
 J. Lehel  
 H. Lenz  
 L.M. Lesniak  
 H. Li  
 R. Lidl  
 C. Lim  
 C. Lindner  
 N. Linial  
 S.L.S. Lins  
 Y. Liu
- F. Maffray  
 N.V.R. Mahadev  
 A.R. Mahjoub  
 E. Makai  
 J. Malkevitch  
 C. Mallows  
 Y. Manoussakis  
 B. Manvel  
 J.S. Martins  
 R. Mathon  
 S.B. Maurer  
 W. McCuaig  
 B.D. McKay  
 T.A. McKee  
 P. McMullen  
 K. Mehlhorn  
 E. Mendelsohn  
 N.S. Mendelsohn  
 R. Meshulam  
 K. Metsch  
 H. Meyniel  
 E.C. Milner  
 J. Min Yu  
 S. Minsker  
 B. Mohar  
 J.W. Moon  
 O. Moreno  
 A.F. Mouyart  
 H.M. Mulder  
 G.L. Mullen  
 R.C. Mullin  
 J. Mykkeltveit  
 C.M. Mynhardt
- J.B. Nation  
 J. Nešetřil  
 A. Neumaier  
 K.C. Ng  
 H. Niederhausen  
 H. Niederreiter  
 H. Noltemeier
- A.M. Odlyzko  
 O.R. Oellermann
- J. Pach  
 C. Payan  
 U.N. Peled  
 D. Perrin  
 E. Pesch  
 V. Petrovic  
 K.T. Phelps  
 R.E. Pippert  
 T. Pisanski  
 V.S. Pless  
 A. Pluhar  
 N. Polat  
 S. Poljak  
 A. Pott  
 M. Preissmann  
 A. Prekopa  
 H. Priestley  
 D. Pritikin  
 J.S. Provan
- M. Randic  
 D.K. Ray-Chaudhuri  
 R.C. Read  
 R. Rees  
 K.B. Reid  
 V. Reiner  
 L. Renner  
 K. Reuter  
 D. Richards  
 R.B. Richter  
 R.D. Ringesen  
 G. Ringel  
 C. Rodger  
 V. Rodl  
 A. Rosa  
 M. Rosenfeld  
 J. Rosenmuller  
 G.-C. Rota  
 D. Rotem  
 L.H. Rowen  
 S. Rudeanu  
 F. Ruskey  
 Z. Ryjacek

- |                     |                   |                   |
|---------------------|-------------------|-------------------|
| H. Sachs            | M. Stiebitz       | A. Vince          |
| B.E. Sagan          | L. Storme         | L. Volkmann       |
| D. Sakai            | V. Strehl         |                   |
| M. Saks             | B. Sturmfels      | L.R. Welch        |
| A. Salomaa          | R.A. Sulanke      | D.J.A. Welsh      |
| N.W. Sauer          | D.P. Sumner       | W. Wenzel         |
| E.R. Scheinerman    | M.M. Syslo        | D.B. West         |
| P. Schellenberg     | Z. Szigeti        | J. West           |
| R.H. Schelp         |                   | A.T. White        |
| I. Schiermeyer      | F. Tamari         | D.E. White        |
| E. Schmeichel       | N. Tandareanu     | N. White          |
| F. Schmidt          | S.M. Tanny        | E.G. Whitehead Jr |
| J. Schonheim        | L. Teirlinck      | H.A. Wilbrink     |
| A. Schrijver        | C. Thomassen      | E. Wilkeit        |
| E. Schulte          | A. Tietavainen    | J.K. Williams     |
| M.P. Schützenberger | I. Tomescu        | P.M. Winkler      |
| K. Seyffarth        | V.D. Tonchev      | D.R. Witte        |
| P.D. Seymour        | W.T. Trotter      | J. Wojciechowski  |
| K.R. Shah           | M. Truszczyński   | J. Wolfmann       |
| J. Shamash          | W.T. Tutte        | D.R. Woodall      |
| Y. Shi              | Z. Tuza           | R.E. Woodrow      |
| R.E. Simion         | H. Tverberg       | N.C. Wormald      |
| J.E. Simpson        |                   |                   |
| J. Siran            | D. Ullman         | S.-J. Xu          |
| N.J.A. Sloane       |                   | H.P. Yap          |
| P. Solé             | G. Valette        | Q. Yu             |
| V. Soltan           | J. van den Heuvel |                   |
| E. Speckenmeyer     | J.H. van Lint     | J. Zaks           |
| J. Spinrad          | H. van Tilborg    | S. Zaks           |
| R. Sritharan        | S.A. Vanstone     | B. Zelinka        |
| W. Staton           | H.J. Veldman      | M. Zheng          |
| W.L. Steiger        | K. Vesztegombi    | X. Zhu            |
| M. Stern            |                   |                   |



## Master index of volumes 121–130

Abe, G., Unsolved problems on magic squares	127	(1994)	3– 13
Achache, A. and A.A.L. Sangalli, Préordres, résiduation et espaces de fermeture	130	(1994)	3– 7
Ahlsweide, R. and G. Simonyi, On the optimal structure of recovering set pairs of lattices: the sandglass conjecture (Note)	128	(1994)	389–394
Albertson, M.O. and D.L. Boutin, Lower bounds for constant degree independent sets	127	(1994)	15– 21
Aldred, R.E.L., D.A. Holton and Z.K. Min	127	(1994)	23– 29
Alon, N., Probabilistic methods in coloring and decomposition problems	127	(1994)	31– 46
Anderson, I. and N.J. Finizio, Cyclic Whist tournaments	125	(1994)	5– 10
Anthony, M., On the mean chromatic number	125	(1994)	11– 14
Assaf, A.M. and L.P.S. Singh, Packing pairs by quintuples with index 2: $v$ odd, $v \not\equiv 13 \pmod{20}$	126	(1994)	1– 12
Bagga, K.S., L.W. Beineke, M.J. Lipman and R.E. Pippert, On the honesty of graph complements	122	(1993)	1– 6
Bagga, K.S., L.W. Beineke, M.J. Lipman and R.E. Pippert, Edge-integrity: a survey	124	(1994)	3– 12
Bandieri, P., Contracted $k$ -tessellations of closed surfaces	122	(1993)	7– 13
Bang-Jensen, J. and P. Hell, On chordal proper circular arc graphs (Note)	128	(1994)	395–398
Barefoot, C.A., L.H. Clark, A.J. Depew, R.C. Entringer and L.A. Székely, Subdivision thresholds for two classes of graphs	125	(1994)	15– 30
Barr, O., On extremal graphs without compatible triangles or quadrilaterals	125	(1994)	31– 43
Bauer, D., A. Morgana and E. Schmeichel, On the complexity of recognizing tough graphs	124	(1994)	13– 17
Bélanger, M.-F., J. Constantin and G. Fournier, Graphes et ordonnés démontables, propriété de la clique fixe	130	(1994)	9– 17
Behzad, M. and E.S. Mahmoodian, Eccentric sequences and triangle sequences of block designs	127	(1994)	47– 56
Beineke, L.W., P. Hamburger and W.D. Goddard, Random packings of graphs	125	(1994)	45– 54

Beineke, L.W., see Bagga, K.S.	122	(1993)	1- 6
Beineke, L.W., see Bagga, K.S.	124	(1994)	3- 12
Bencherif Ait-Djafer, H., On cycle lengths in graphs of moderate degree	125	(1994)	55- 62
Bendali, F. and A. Quilliot, Compatibilité entre structures d'intervalles et relations d'ordre	130	(1994)	19- 37
Bernaldez, J.M., On cyclically K-complementary graphs	127	(1994)	57- 62
Berrachedi, A., A new characterization of median graphs ( <i>Communication</i> )	128	(1994)	385-387
Bielak, H., Graphs with special neighbourhood orderings of vertices	121	(1993)	3- 9
Bierbrauer, J., A family of perpendicular arrays achieving perfect 4-fold secrecy	125	(1994)	63- 66
Biggs, N., Combinatorics and connectionism	124	(1994)	19- 36
Biondi, P., A classification of finite $\{n-2, n\}$ -biregular spaces	129	(1994)	3- 18
Bóna, M., A Euclidean Ramsey theorem ( <i>Note</i> )	122	(1993)	349-352
Bolla, M. and G. Tusnády, Spectra and optimal partitions of weighted graphs	128	(1994)	1- 20
Bollobás, B. and I. Leader, Maximal sets of given diameter in the grid and the torus	122	(1993)	15- 35
Borodin, O.V., Simultaneous coloring of edges and faces of plane graphs	128	(1994)	21- 33
Borowiecki, M. and E. Drgas-Burchardt, Classes of chromatically unique or equivalent graphs	121	(1993)	11- 18
Boutin, D.L., see Albertson, M.O.	127	(1994)	15- 21
Bowler, A., Generalised Bhaskar Rao designs over non-Abelian groups	125	(1994)	67- 72
Brading, P.W., see Preece, D.A.	125	(1994)	319-327
Brandes, H., H. Harborth, H.-D.O.F. Gronau and C. Schwahn, Ramsey numbers for sets of small graphs	125	(1994)	73- 86
Brightwell, G., Linear extensions of random orders	125	(1994)	87- 96
Broersma, H.J., A note on $K_4$ -closures in hamiltonian graph theory	121	(1993)	19- 23
Broersma, H.J., J. van den Heuvel and H.J. Veldman, Long cycles, degree sums and neighborhood unions	121	(1993)	25- 35
Broersma, H.J., J. van den Heuvel and H.J. Veldman, A generalization of Ore's Theorem involving neighborhood unions	122	(1993)	37- 49
Broersma, H.J. and I. Schiermeyer, A closure concept based on neighborhood unions of independent triples	124	(1994)	37- 47
Brouwer, A.E., On the uniqueness of a regular thin near octagon on 288 vertices (or the semiplane belonging to the Mathieu group $M_{12}$ )	126	(1994)	13- 27



Brouwer, A.E. and M. Numata, A characterization of some graphs which do not contain 3-claws	124	(1994)	49- 54
Brualdi, R.A. and J.J.Q. Massey, Incidence and strong edge colorings of graphs	122	(1993)	51- 58
Bruen, A.A., Solution to a question of A. Beutelspacher on finite linear spaces	129	(1994)	219-220
Buekenhout, F., Questions about linear spaces	129	(1994)	19- 27
Burlet, M., J. Fonlupt, Polyhedral consequences of the amalgam operation	130	(1994)	39- 55
Čepulić, V., On symmetric block designs (40,13,4) with automorphisms of order 5	128	(1994)	45- 60
Căzănescu, V.-E. and G. Ștefănescu, Classes of finite relations as initial abstract data types — II	126	(1994)	47- 65
Calahan, R. and R.B. Gardner, Bicyclic Steiner triple systems	128	(1994)	35- 44
Cameron, P.J., An orbit theorem for Steiner triple systems	125	(1994)	97-100
Cameron, P.J., Two-graphs and trees	127	(1994)	63- 74
Cameron, P.J., Infinite linear spaces	129	(1994)	29- 41
Carnes, N.P., Cyclic antiautomorphisms of Mendelsohn triple systems	126	(1994)	29- 45
Caro, Y., I. Krasikov and Y. Roditty, On induced subgraphs of trees, with restricted degrees	125	(1994)	101-106
Carrillo, L.D., Hamiltonian-connected self-complementary graphs	127	(1994)	75- 93
Chan, W.-K., M.-K. Siu and S.-L. Ma, Nonexistence of certain perfect arrays	125	(1994)	107-113
Chang, G.J., The domatic number problem	125	(1994)	115-122
Chen, J., Sharp bound of the $k$ th eigenvalue of trees	128	(1994)	61- 72
Chen, J., J.L. Gross and R.G. Rieper, Overlap matrices and total imbedding distributions	128	(1994)	73- 94
Chen, W.Y.C., The theory of compositionals	122	(1993)	59- 87
Chernoff, W.W., Permutations with $P^l$ -th roots	125	(1994)	123-127
Christofi, C., Enumerating $4 \times 5$ and $5 \times 6$ double Youden rectangles	125	(1994)	129-135
Chu, W. and L.C. Hsu, On some classes of inverse series relations and their applications	123	(1993)	3- 15
Clark, L.H., see Barefoot, C.A.	125	(1994)	15- 30
Côté, M., see Preece, D.A.	125	(1994)	319-327
Cockayne, E.J., and C.M. Mynhardt, The sequence of upper and lower domination, independence and irredundance numbers of a graph	122	(1993)	89-102
Cockayne, E.J., G. MacGillivray and C.M. Mynhardt, Convexity of minimal dominating functions of trees — II	125	(1994)	137-146

Collins, K.L., Factoring distance matrix polynomials	122	(1993)	103-112
Constantin, J., see Bélanger, M.-F.	130	(1994)	9- 17
Dai, Z., X. Feng, M. Liu and Z. Wan, Nonlinear feedforward sequences of $m$ -sequences I	123	(1993)	17- 34
Damaschke, P., see Kratsch, D.	128	(1994)	269-275
Das, S. and M. Sen, An interval digraph in relation to its associated bipartite graph	122	(1993)	113-136
Davis, R. and C. Wagner, Covering algebras and $q$ -binomial generating functions	128	(1994)	95-111
Day, D.P., O.R. Oellermann and H.C. Swart, On the $l$ -connectivity of a digraph	127	(1994)	95-104
De Vito, P. and P.M. Lo Re, On some classes of linear spaces embedded in a Pappian plane	129	(1994)	43- 52
De Felice, C., A partial result about the factorization conjecture for finite variable-length codes	122	(1993)	137-152
De Simone, C., M. Deza and M. Laurent, Collapsing and lifting for the cut cone	127	(1994)	105-130
de Werra, D., see Hilton, A.J.W.	128	(1994)	179-201
Dean, N., L. Lesniak and A. Saito, Cycles of length 0 modulo 4 in graphs	121	(1993)	37- 49
Dean, N. and J. Zito, Well-covered graphs and extendability	126	(1994)	67- 80
Dejter, I.J., On symmetric subgraphs of the 7-cube: an overview	124	(1994)	55- 66
Dekking, F.M., Iteration of maps by an automaton	126	(1994)	81- 86
Del Fra, A. and D. Ghinelli, $Af^*$ , $Af$ geometries, the Klein quadric and $\mathcal{H}_4^*$	129	(1994)	53- 74
Delandtsheer, A., Classifications of finite highly transitive dimensional linear spaces	129	(1994)	75-111
Deng, C.-L. and C.-K. Lim, A class of clique-closed graphs	127	(1994)	131-137
Depew, A.J., see Barefoot, C.A.	125	(1994)	15- 30
Deza, M., see De Simone, C.	127	(1994)	105-130
Dong, F. and Y. Liu, Counting rooted near-triangulations on the sphere	123	(1993)	35- 45
Drgas-Burchardt, E., see Borowiecki, M.	121	(1993)	11- 18
Dridi, T., Distributions binaires unimodales ( <i>Communication</i> )	126	(1994)	373-378
Dür, A., On the covering radius of Reed-Solomon codes	126	(1994)	99-105
Duchet, P. and V. Kaneti, Sur la contractibilité d'un graphe orienté en $K_4^*$	130	(1994)	57- 68
Dugdale, J.K. and A.J.W. Hilton, The total chromatic number of regular graphs whose complement is bipartite	126	(1994)	87- 98
Edelman, P.H. and R. Simion, Chains in the lattice of noncrossing partitions	126	(1994)	107-119

Ehrenfeucht, A., T. Harju and G. Rozenberg, Incremental construction of 2-structures	128	(1994)	113-141
Enns, T.C., Hamiltonian circuits and paths in subset graphs with circular adjacency	122	(1993)	153-165
Entringer, R.C., see Barefoot, C.A.	125	(1994)	15- 30
Erdős, P., R.J. Faudree and C.C. Rousseau, Extremal problems and generalized degrees	127	(1994)	139-152
Erdős, P., R.J. Faudree, C.C. Rousseau and R.H. Schelp, A local density condition for triangles	127	(1994)	153-161
Erickson, M., A conjecture concerning Ramsey's theorem (Note)	126	(1994)	395-398
Fàbrega, J., see Fiol, M.A.	125	(1994)	169-176
Fàbrega, J. and M.A. Fiol, Extraconnectivity of graphs with large girth	127	(1994)	163-170
Faradzev, I.A., Association schemes on the set of antiflags of projective plane	127	(1994)	171-179
Faudree, R.J., R.H. Schelp, L. Lesniak, A. Gyárfás and J. Lehel, On the rotation distance of graphs	126	(1994)	121-135
Faudree, R.J., see Erdős, P.	127	(1994)	139-152
Faudree, R.J., see Erdős, P.	127	(1994)	153-161
Favaron, O., A note on the irredundance number after vertex deletion	121	(1993)	51- 54
Favaron, O., P. Mago and O. Ordaz, On the bipartite independence number of a balanced bipartite graph	121	(1993)	55- 63
Favaron, O. and J.L. Fouquet, On $m$ -centers in $P_t$ -free graphs	125	(1994)	147-152
Feng, X., see Dai, Z.	123	(1993)	17- 34
Fiedler, M., Some minimax problems for graphs	121	(1993)	65- 74
Finbow, A., B. Hartnell and C. Whitehead, A characterization of graphs of girth eight or more with exactly two sizes of maximal independent sets	125	(1994)	153-167
Finizio, N.J., see Anderson, I.	125	(1994)	5- 10
Fiol, M.A., The superconnectivity of large digraphs and graphs	124	(1994)	67- 78
Fiol, M.A., see Fàbrega, J.	127	(1994)	163-170
Fiol, M.A. and J. Fàbrega, On the distance connectivity of graphs and digraphs	125	(1994)	169-176
Fonlupt, J., see Burlet, M.	130	(1994)	39- 55
Fouquet, J.L., see Favaron, O.	125	(1994)	147-152
Fouquet, J.L. and A.P. Wojda, Mutual placement of bipartite graphs	121	(1993)	85- 92
Fouquet, J.L., A decomposition for a class of $(P_3, \bar{P}_3)$ -free graphs	121	(1993)	75- 83

Fournier, G., see Bélanger, M.-F.	130	(1994)	9- 17
Fournier, G. and L. Gagnon, Théorème de point fixe asymptotique dans les ordonnés infinis	130	(1994)	69- 76
Fraenkel, A.S. and C. Kimberling, Generalized Wythoff arrays, shuffles and interspersions	126	(1994)	137-149
Freiman, G.A., New analytical results in subset-sum problem ( <i>Erratum</i> )	126	(1994)	447
Frick, M. and M.A. Henning, Extremal results on defective colorings of graphs	126	(1994)	151-158
Fronček, D., e-Realization of double-stars ( <i>Note</i> )	126	(1994)	399-402
Frydrych, W., All nonhamiltonian tough graphs satisfying a 3-degree sum and Fan-type conditions	121	(1993)	93-104
Fu, H.-L. and W.-H. Hu, Disjoint odd integer subsets having a constant odd sum	128	(1994)	143-150
Fu, H.-L. and K.-C. Huang, On prime labellings	127	(1994)	181-186
Füredi, Z., Random Ramsey graphs for the four-cycle ( <i>Note</i> )	126	(1994)	407-410
Füredi, Z., Intersecting designs from linear programming and graphs of diameter two	127	(1994)	187-207
Fulman, J., A generalization of Vizing's theorem on domination ( <i>Note</i> )	126	(1994)	403-406
Gagnon, L., see Fournier, G.	130	(1994)	69- 76
Galeana-Sánchez, H., Normal fraternally orientable graphs satisfy the strong perfect graph conjecture	122	(1993)	167-177
Gao, S., see Wei, W.-D.	123	(1993)	151-177
Gao, Z., The number of degree restricted maps on general surfaces	123	(1993)	47- 63
Gardner, R.B., see Calahan, R.	128	(1994)	35- 44
Ghinelli, D., see Del Fra, A.	129	(1994)	53- 74
Gionfriddo, M. and Z. Tuza, On conjectures of Berge and Chvátal	124	(1994)	79- 86
Goddard, W. and D.J. Kleitman, An upper bound for the Ramsey numbers $r(K_3, G)$	125	(1994)	177-182
Goddard, W.D., see Beineke, L.W.	125	(1994)	45- 54
Gordon, D.M., R.W. Robinson and F. Harary, Minimum degree games for graphs	128	(1994)	151-163
Grannell, M.J. and T.S. Griggs, A Steiner system $S(5, 6, 108)$	125	(1994)	183-186
Greenough, P.P. and R. Hill, Optimal linear codes over GF(4)	125	(1994)	187-199
Griggs, T.S., see Grannell, M.J.	125	(1994)	183-186
Griggs, J.R. and D.J. Kleitman, Independence and the Havel-Hakimi residue	127	(1994)	209-212
Gronau, H.-D.O.F., see Brandes, H.	125	(1994)	73- 86

- Gropp, H., Nonsymmetric configurations with natural index 124 (1994) 87- 98
- Gropp, H., On symmetric spatial configurations 125 (1994) 201-209
- Gropp, H., Configurations and  $(r, 1)$ -designs 129 (1994) 113-137
- Gross, J.L., see Chen, J. 128 (1994) 73- 94
- Gutman, I., see Petrović, M.M. 126 (1994) 239-244
- Gyárfás, A., see Faudree, R.J. 126 (1994) 121-135
- Hamburger, P., see Beineke, L.W. 125 (1994) 45- 54
- Hansen, P. and M. Zheng, A linear algorithm for perfect matching in hexagonal systems 122 (1993) 179-196
- Hanson, D., G. MacGillivray and D. Youngs, The size of a minimum five-chromatic  $K_4$ -free graph (*Note*) 122 (1993) 353-355
- Harant, J., An upper bound for the radius of a 3-connected graph (*Communication*) 122 (1993) 335-341
- Harary, F., S. Lawrencenko and V. Korzhik, Realizing the chromatic numbers of triangulations of surfaces 122 (1993) 197-204
- Harary, F., Sum graphs over all the integers 124 (1994) 99-105
- Harary, F., see Gordon, D.M. 128 (1994) 151-163
- Harary, F. and T.A. McKee, The square of a chordal graph 128 (1994) 165-172
- Harborth, H., see Brandes, H. 125 (1994) 73- 86
- Harju, T., see Ehrenfeucht, A. 128 (1994) 113-141
- Hartman, A., The fundamental construction for 3-designs 124 (1994) 107-132
- Hartnell, B.L. and D.F. Rall, Bounds on the bondage number of a graph 128 (1994) 173-177
- Hartnell, B., see Finbow, A. 125 (1994) 153-167
- Hazan, S. and I.G. Rosenberg, TC-clones maximaux, graphes et relations 130 (1994) 77- 82
- Hell, P., see Bang-Jensen, J. 128 (1994) 395-398
- Hell, P., X. Yu and H. Zhou, Independence ratios of graph powers 127 (1994) 213-220
- Henning, M.A., see Frick, M. 126 (1994) 151-158
- Hill, R., see Greenough, P.P. 125 (1994) 187-199
- Hilton, A.J.W., see Dugdale, J.K. 126 (1994) 87- 98
- Hilton, A.J.W. and D. de Werra, A sufficient condition for equitable edge-colourings of simple graphs 128 (1994) 179-201
- Hind, H.R., Recent developments in total colouring 125 (1994) 211-218
- Hoede, C. and X. Li, Clique polynomials and independent set polynomials of graphs 125 (1994) 219-228
- Holton, D.A., see Aldred, R.E.L. 127 (1994) 23- 29
- Hong, Y., Bounds of eigenvalues of graphs 123 (1993) 65- 74
- Honkala, I., On the normality of multiple covering codes 125 (1994) 229-239
- Horák, P. and Z. Tuza, Large  $s$ -representable set systems with low maximum degree 122 (1993) 205-217

Hotje, H., M. Marchi and S. Pianta, On a class of point-reflection geometries	129	(1994)	139-147
Hou, H.-d., Classification of cosets of the Reed-Muller code $R(m-3, m)$	128	(1994)	203-224
Hsu, L.C., see Chu, W.	123	(1993)	3-15
Hu, W.-H., see Fu, H.-L.	128	(1994)	143-150
Huang, R. and G.-C. Rota, On the relations of various conjectures on Latin squares and straightening coefficients	128	(1994)	225-236
Huang, K.-C., see Fu, H.-L.	127	(1994)	181-186
Hurlbert, G., The antipodal layers problem	128	(1994)	237-245
Iorgulescu, A., $\mathcal{S}$ -prealgebras (Note)	126	(1994)	415-419
Ivanov, A.V., Two families of strongly regular graphs with the 4-vertex condition	127	(1994)	221-242
Ivashchenko, A.V., Representation of smooth surfaces by graphs. Transformations of graphs which do not change the Euler characteristic of graphs	122	(1993)	219-233
Ivashchenko, A.V., Contractible transformations do not change the homology groups of graphs	126	(1994)	159-170
Ivashchenko, A.V. and Y.-N. Yeh, Minimal graphs of a torus, a projective plane and spheres and some properties of minimal graphs of homotopy classes	126	(1994)	171-178
Ivashchenko, A.V., Graphs of spheres and tori	128	(1994)	247-255
Janakiraman, T.N., On special classes of self-centred graphs (Note)	126	(1994)	411-414
Jedwab, J., C. Mitchell, F. Piper and P. Wild, Perfect binary arrays and difference sets	125	(1994)	241-254
Jia, X.-D., Some remarks on minimal bases and maximal nonbases of integers (Note)	122	(1993)	357-362
Johns, G., A simple proof of the characterization of antipodal graphs (Note)	128	(1994)	399-400
Kajitani, Y., see Takahashi, A.	127	(1994)	293-304
Kalinowski, R., Small periods of endomorphisms of trees	121	(1993)	105-111
Kamath, G.D., see Sampathkumar, E.	124	(1994)	173-177
Kaneti, V., see Duchet, P.	130	(1994)	57-68
Katona, G.O.H. and L.V. Quintas, The largest component in a random subgraph of the $n$ -cycle	121	(1993)	113-116
Kimberling, C., see Fraenkel, A.S.	126	(1994)	137-149
Kimura, H., Classification of Hadamard matrices of order 28 with Hall sets	128	(1994)	257-268
Kleitman, D.J., see Goddard, W.	125	(1994)	177-182

Kleitman, D.J., see Griggs, J.R.	127 (1994) 209-212
Knessl, C., Asymptotic behavior of high-order differences of the plane partition function	126 (1994) 179-193
Kołodziejczyk, K., Borsuk covering and planar sets with unique completion	122 (1993) 235-244
König, J.-C. and D. Sotteau, Symmetric routings of the hypercube	121 (1993) 123-134
Koh, K.M., see Teo, C.P.	128 (1994) 327-335
Koh, K.M. and K.L. Teo, Chromatic classes of 2-connected( $n, n+3$ )-graphs with at least two triangles	127 (1994) 243-258
Konieczna, U., Asymptotic normality of subcubes in random subgraphs of the $n$ -cube	121 (1993) 117-122
Korzhik, V., see Harary, F.	122 (1993) 197-204
Krasikov, I. and J. Schonheim, On near subgroups	124 (1994) 133-136
Krasikov, I., see Caro, Y.	125 (1994) 101-106
Kratsch, D., P. Damaschke and A. Lubiw, Dominating cliques in chordal graphs	128 (1994) 269-275
Krattenthaler, C. and S.G. Mohanty, $q$ -Generalization of a ballot problem	126 (1994) 195-208
Kubale, M., Interval edge coloring of a graph with forbidden colors	121 (1993) 135-143
Kwaśnik, M., The primitivity of the strong product of two directed graphs	121 (1993) 145-150
Labahn, R. and I. Warnke, Quick gossiping by telegraphs (Note)	126 (1994) 421-424
Lai, C., On the size of graphs with all cycle having distinct length (Note)	122 (1993) 363-364
Lam, C.W.H., see Preece, D.A.	125 (1994) 319-327
Lascoux, A. and P. Pragacz, Divided differences and ideals generated by symmetric polynomials	126 (1994) 209-215
Laskar, R., S. Stueckle and B. Piazza, On the edge-integrity of some graphs and their complements	122 (1993) 245-253
Laurent, M., see De Simone, C.	127 (1994) 105-130
Laviolette, F., Decomposition of infinite eulerian graphs with a small number of vertices of infinite degree	130 (1994) 83- 87
Lawrencenko, S., see Harary, F.	122 (1993) 197-204
Laywine, C., A counter-example to a conjecture relating complete sets of frequency squares and affine geometries	122 (1993) 255-262
Leader, I., see Bollobás, B.	122 (1993) 15- 35
Lehel, J., see Faudree, R.J.	126 (1994) 121-135
Lepović, M., see Petrović, M.M.	126 (1994) 239-244
Lepović, M., Some kinds of energies of graphs	128 (1994) 277-282



- |  |            |         |
|--|------------|---------|
| Lesniak, L., see Faudree, R.J.   | 126 (1994) | 121-135 |
| Lesniak, L., see Dean, N.  | 121 (1993) | 37- 49  |
| Lewin, M., On the coefficients of the characteristic polynomial of a matrix  | 125 (1994) | 255-262 |
| Li, N.-Z. and E.G. Whitehead Jr, The chromaticity of certain graphs with five triangles ( <i>Note</i> )                      | 122 (1993) | 365-372 |
| Li, Q. and J. Shao, The index set problem for Boolean (or nonnegative) matrices  | 123 (1993) | 75- 92  |
| Li, W., see Shi, F.  | 123 (1993) | 111-115 |
| Li, X., see Hoede, C.  | 125 (1994) | 219-228 |
| Lim, C.-K., see Deng, C.-L.  | 127 (1994) | 131-137 |
| Lipman, M.J., see Bagga, K.S.  | 122 (1993) | 1- 6    |
| Lipman, M.J., see Bagga, K.S.  | 124 (1994) | 3- 12   |
| Liu, M., see Dai, Z.   | 123 (1993) | 17- 34  |
| Liu, Y., On functional equations arising from map enumerations   | 123 (1993) | 93-109  |
| Liu, Y., see Dong, F.  | 123 (1993) | 35- 45  |
| Lo Re, P.M., see De Vito, P.   | 129 (1994) | 43- 52  |
| Lonc, Z., Majorization, packing, covering and matroids   | 121 (1993) | 151-157 |
| London, E., A new proof of the colored Kruskal-Katona theorem  | 126 (1994) | 217-223 |
| Lovász, L., Stable sets and polynomials  | 124 (1994) | 137-153 |
| Lovrečić Saražin, M., On the hamiltonian index of a graph ( <i>Note</i> )  | 122 (1993) | 373-376 |
| Lubiw, A., see Kratsch, D.   | 128 (1994) | 269-275 |
| Ma, S.L., see Chan, W.-K.  | 125 (1994) | 107-113 |
| Ma, S.L., On subsets of partial difference sets  | 125 (1994) | 263-272 |
| MacGillivray, G., see Cockayne, E.J.   | 125 (1994) | 137-146 |
| MacGillivray, G., see Hanson, D.   | 122 (1993) | 353-355 |
| Mago, P., see Favaron, O.  | 121 (1993) | 55- 63  |
| Mahmoodian, S.E., see Behzad, M.   | 127 (1994) | 47- 56  |
| Majcher, Z., Some special realizations of partition matrix sequences   | 121 (1993) | 159-175 |
| Marchi, M., see Hotje, H.  | 129 (1994) | 139-147 |
| Martin, N., Solving a conjecture of Sedlacek: maximal edge sets in the 3-uniform sumset hypergraphs                          | 125 (1994) | 273-277 |
| Maschietti, A. and G. Migliori, On $q^2/4$ -sets of type $(0, q/4, q/2)$ in projective planes of order $q \equiv 0 \pmod{4}$ | 129 (1994) | 149-158 |
| Massey, J.J.Q., see Brualdi, R.A.  | 122 (1993) | 51- 58  |
| Massey, J.L., see Yang, X.   | 126 (1994) | 391-393 |
| Mayhew, G.L., Weight class distributions of de Bruijn sequences ( <i>Note</i> )  | 126 (1994) | 425-429 |



McDiarmid, C.J.H. and A. Sánchez-Arroyo, Total colouring regular bipartite graphs is NP-hard	124	(1994)	155-162
McDiarmid, C.J.H. and J. Ramirez Alfonsin, Sharing jugs of wine	125	(1994)	279-287
McKee, T.A., see Harary, F.	128	(1994)	165-172
Miao, Y., Existence of resolvable BIBDs with $k = 5$ and $\lambda = 4$	128	(1994)	283-303
Migliori, G., see Maschietti, A.	129	(1994)	149-158
Milici, S. and Z. Tuza, The spectrum of $\lambda$ -times repeated blocks for $TS(v, \lambda)$	129	(1994)	159-166
Min, Z.K., see Aldred, R.E.L.	127	(1994)	23- 29
Mitchell, C., see Jedwab, J.	125	(1994)	241-254
Mohanty, S.G., see Krattenthaler, C.	126	(1994)	195-208
Montenegro, E. and R. Salazar, A result about the incident edges in the graphs $M_k$ (Note)	122	(1993)	377-380
Moon, J.W., Some determinant expansions and the matrix-tree theorem	124	(1994)	163-171
Morgana, A., see Bauer, D.	124	(1994)	13- 17
Mushtaq, Q. and F. Shaheen, Factor groups of $G^{6,6,6}$ , through coset diagrams for an action on $PL(F_q)$	126	(1994)	225-238
Mynhardt, C.M., see Cockayne, E.J.	122	(1993)	89-102
Mynhardt, C.M., see Cockayne, E.J.	125	(1994)	137-146
Nedela, R., Covering spaces of locally homogeneous graphs	121	(1993)	177-188
Nomura, K., An application of intersection diagrams of high rank	127	(1994)	259-264
Numata, M., see Brouwer, A.E.	124	(1994)	49- 54
Oellermann, O.R., see Day, D.P.	127	(1994)	95-104
Ordaz, O., see Favaron, O.	121	(1993)	55- 63
Peroche, B. and C. Virlouvet, Minimally 4-edge <sup>#</sup> -connected graphs	125	(1994)	289-299
Petrović, M.M., I. Gutman and M. Lepović, Graphs with small numbers of independent edges	126	(1994)	239-244
Pianta, S., see Hotje, H.	129	(1994)	139-147
Piazza, B.L., R.D. Ringeisen and S.K. Stueckle, Subtrack-leable graphs and four cycles	127	(1994)	265-276
Piazza, B., see Laskar, R.	122	(1993)	245-253
Piper, F., see Jedwab, J.	125	(1994)	241-254
Pippert, R.E., see Bagga, K.S.	122	(1993)	1- 6
Pippert, R.E., see Bagga, K.S.	124	(1994)	3- 12
Pirillo, G., On a combinatorial property of Fibonacci semigroup	122	(1993)	263-267

Plummer, M.D., Extending matchings in claw-free graphs	125	(1994)	301-307
Plummer, M.D., Extending matchings in graphs: A survey	127	(1994)	277-292
Polat, N. and G. Sabidussi, Fixed elements of infinite trees	130	(1994)	97-102
Polat, N., Minimax theorems for infinite graphs with the ends as ideal points	130	(1994)	89-96
Politof, T. and A. Satyanarayana, Minors of quasi 4-connected graphs	126	(1994)	245-256
Pouzet, M. and I.G. Rosenberg, General metrics and contracting operations	130	(1994)	103-169
Pragacz, P., see Lascoux, A.	126	(1994)	209-215
Preece, D.A., Double Youden rectangles — an update with examples of size $5 \times 11$	125	(1994)	309-317
Preece, D.A., P.W. Brading, C.W.H. Lam and M. Côté, Balanced $6 \times 6$ designs for 4 equally replicated treatments	125	(1994)	319-327
Quilliot, A., see Bendali, F.	130	(1994)	19-37
Quintas, L.V., see Katona, G.O.H.	121	(1993)	113-116
Rall, D.F., see Hartnell, B.L.	128	(1994)	173-177
Ramirez Alfonsin, J., see McDiarmid, C.J.H.	125	(1994)	279-287
Rawlings, D., Limit formulas for $q$ -exponential functions ( <i>Communication</i> )	126	(1994)	379-383
Ray, N. and W. Schmitt, Ultimate chromatic polynomials	125	(1994)	329-341
Rice, V. and R.D. Ringeisen, On cohesion stable graphs	126	(1994)	257-272
Richter, R.B., P.D. Seymour and J. Širáň, Circular embeddings of planar graphs in nonspherical surfaces	126	(1994)	273-280
Rieper, R.G., see Chen, J.	128	(1994)	73-94
Ringeisen, R.D., see Piazza, B.L.	127	(1994)	265-276
Ringeisen, R.D., see Rice, V.	126	(1994)	257-272
Riskin, A., Projective plane embeddings of polyhedral pinched maps	126	(1994)	281-291
Robinson, R.W., see Gordon, D.M.	128	(1994)	151-163
Rodger, C.A., Linear spaces with many small lines	129	(1994)	167-180
Roditty, Y., see Caro, Y.	125	(1994)	101-106
Rosa, A. and S. Znám, Packing pentagons into complete graphs: how clumsy can you get?	128	(1994)	305-316
Rosenberg, I.G., see Hazan, S.	130	(1994)	77-82
Rosenberg, I.G., see Pouzet, M.	130	(1994)	103-169
Rota, G.-C., see Huang, R.	128	(1994)	225-236
Roth, R.L., Perfect colorings of multipatterns in the plane	122	(1993)	269-286
Rousseau, C.C., see Erdős, P.	127	(1994)	139-152
Rousseau, C.C., see Erdős, P.	127	(1994)	153-161
Rowlinson, P., see Yang, Y.	125	(1994)	399-406

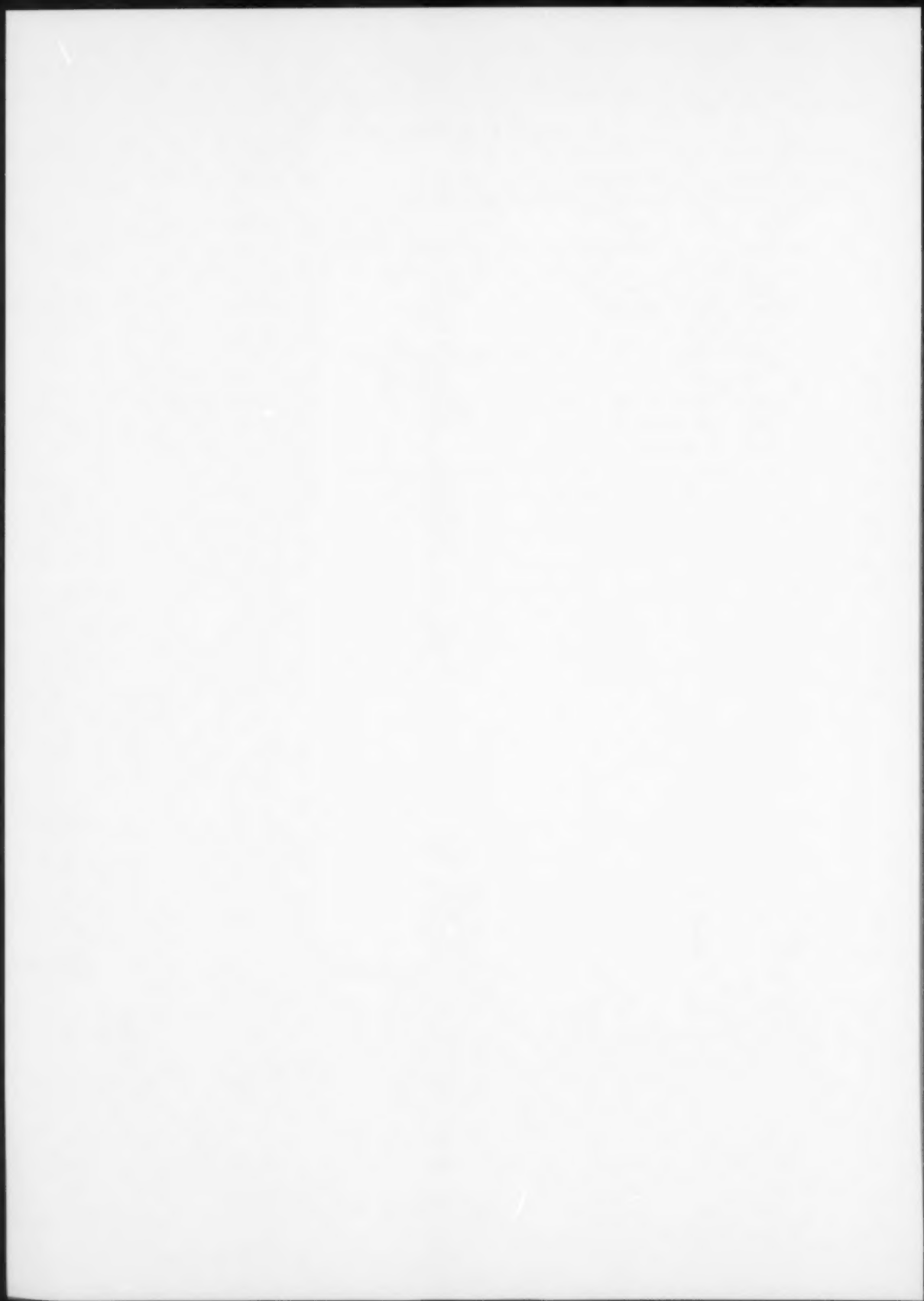
Rozenberg, G., see Ehrenfeucht, A.	128	(1994)	113-141
Rudeanu, S., Unique solutions of Boolean ring equations (Note)	122	(1993)	381-383
Ryjáček, Z., $N_2$ -locally disconnected graphs	121	(1993)	189-193
Stefănescu, G., see Căzănescu, V.-E.	126	(1994)	47- 65
Širáň, J., see Richter, R.B.	126	(1994)	273-280
Širáň, J. and M. Škoviera, Regular maps from Cayley graphs II: Antibalanced Cayley maps	124	(1994)	179-191
Škoviera, M., see Širáň, J.	124	(1994)	179-191
Sánchez-Arroyo, A., see McDiarmid, C.J.H.	124	(1994)	155-162
Sabidussi, G., see Polat, N.	130	(1994)	97-102
Sagan, B.E., Y.-N. Yeh and G.M. Ziegler, Maximizing Möbius functions on subsets of Boolean algebras	126	(1994)	293-311
Saito, A., see Dean, N.	121	(1993)	37- 49
Salazar, R., see Montenegro, E.	122	(1993)	377-380
Sampathkumar, E. and G.D. Kamath, A generalization of chromatic index	124	(1994)	173-177
Sangalli, A.A.L., see Achache, A.	130	(1994)	3- 7
Sankaran, P. and K. Varadarajan, A note on the homotopy type of posets	126	(1994)	313-323
Sarti, S.D., Remarks on umbral evaluations of chromatic polynomials (Note)	126	(1994)	431-437
Sato, I., Isomorphisms and some graph coverings	128	(1994)	317-326
Satyanarayana, A., see Politof, T.	126	(1994)	245-256
Schaar, G., On 'maximal' Hamiltonian cycles in the square of a block	121	(1993)	195-198
Schelp, R.H., see Faudree, R.J.	126	(1994)	121-135
Schelp, R.H., see Erdős, P.	127	(1994)	153-161
Schiermeyer, I., The $k$ -SATISFIABILITY problem remains NP- complete for dense families	125	(1994)	343-346
Schiermeyer, I., see Broersma, H.J.	124	(1994)	37- 47
Schmeichel, E., see Bauer, D.	124	(1994)	13- 17
Schmitt, W., see Ray, N.	125	(1994)	329-341
Schonheim, J., see Krasikov, I.	124	(1994)	133-136
Schwahn, C., see Brandes, H.	125	(1994)	73- 86
Selkow, S.M., The independence number of graphs in terms of degrees (Communication)	122	(1993)	343-348
Sen, M., see Das, S.	122	(1993)	113-136
Seymour, P.D., see Richter, R.B.	126	(1994)	273-280
Shaheen, F., see Mushtaq, Q.	126	(1994)	225-238
Shao, J., see Li, Q.	123	(1993)	75- 92
Sheehan, J., Graphical decompositions	125	(1994)	347-355

- Shi, F. and W. Li, The density of a maximum minimal cut in the subset lattice of a finite set is almost one 123 (1993) 111-115
- Shi, Y., On simple MCD graphs containing a subgraph homeomorphic to  $K_4$  126 (1994) 325-338
- Shyr, H.J., S.S. Yu and G. Thierrin, Monogenic  $e$ -closed languages and dipolar words 126 (1994) 339-348
- Simion, R., see Edelman, P.H. 126 (1994) 107-119
- Simonyi, G., see Ahlswede, R. 128 (1994) 389-394
- Singh, L.P.S., see Assaf, A.M. 126 (1994) 1-12
- Sinha, K., A class of  $q$ -ary codes (*Note*) 126 (1994) 439-440
- Siu, M.-K., see Chan, W.-K. 125 (1994) 107-113
- Solé, P. and T. Zaslavsky, Maximality of the cycle code of a graph (*Note*) 128 (1994) 401-405
- Solé, P., The edge-forwarding index of orbital regular graphs 130 (1994) 171-176
- Soiteau, D., see König, J.-C. 121 (1993) 123-134
- Stallmann, M.F.M., On counting planar embeddings (*Note*) 122 (1993) 385-392
- Stewart, I.A., Deciding whether a planar graph has a cubic subgraph is NP-complete 126 (1994) 349-357
- Stiebitz, M., The forest plus stars colouring problem (*Communication*) 126 (1994) 385-389
- Storme, L. and J.A. Thas,  $k$ -Arcs and dual  $k$ -arcs 125 (1994) 357-370
- Stroppel, M., Stable planes 129 (1994) 181-189
- Stueckle, S., see Laskar, R. 122 (1993) 245-253
- Stueckle, S., see Wang, L. 128 (1994) 361-369
- Stueckle, S.K., see Piazza, B.L. 127 (1994) 265-276
- Swart, H.C., see Day, D.P. 127 (1994) 95-104
- Székely, L.A., see Barefoot, C.A. 125 (1994) 15-30
- Takahashi, A., S. Ueno and Y. Kajitani, Minimal acyclic forbidden minors for the family of graphs with bounded path-width 127 (1994) 293-304
- Tallini, G., Asymptotic questions in Galois geometries 129 (1994) 191-203
- Teo, K.L., see Koh, K.M. 127 (1994) 243-258
- Teo, C.P. and K.M. Koh, On chromatic uniqueness of uniform subdivisions of graphs 128 (1994) 327-335
- Teschner, U., A counterexample to a conjecture on the bondage number of a graph (*Note*) 122 (1993) 393-395
- Thas, J.A., see Storme, L. 125 (1994) 357-370
- Thatte, B.D., Some results and approaches for reconstruction conjectures 124 (1994) 193-216
- Thierrin, G., see Shyr, H.J. 126 (1994) 339-348
- Thomassen, C., Embeddings of graphs 124 (1994) 217-228

Thurber, E.G., Addition chains — an erratic sequence	122	(1993)	287-305
Ting, S.-T. and S.-Y. Zhao, The general Steiner problem in rectangular crisscross space	123	(1993)	117-120
Tkáč, M., On shortness coefficients of simple 3-polytopal graphs with only one type of faces besides triangles ( <i>Note</i> )	128	(1994)	407-413
Topp, J., Graphs with unique minimum edge dominating sets and graphs with unique maximum independent sets of vertices	121	(1993)	199-210
Triesch, E., A probabilistic upper bound for the edge identification complexity of graphs	125	(1994)	371-376
Tsuchiya, M., On antichain intersection numbers, total clique covers and regular graphs	127	(1994)	305-318
Tu, G.-Z., A combinatorial formula relating to Hirota's bilinear equations	123	(1993)	121-129
Tusnády, G., see Bolla, M.	128	(1994)	1- 20
Tuza, Z., see Horák, P.	122	(1993)	205-217
Tuza, Z., see Gionfriddo, M.	124	(1994)	79- 86
Tuza, Z., Monochromatic coverings and tree Ramsey numbers	125	(1994)	377-384
Tuza, Z., Largest size and union of Helly families	127	(1994)	319-327
Tuza, Z., see Milici, S.	129	(1994)	159-166
Ueberberg, J., Symbolic incidence geometry and finite linear spaces	129	(1994)	205-217
Ueda, T., Graphs of nonsingular threshold transformations	128	(1994)	349-359
Ueno, S., see Takahashi, A.	127	(1994)	293-304
van den Heuvel, J., see Broersma, H.J.	121	(1993)	25- 35
van den Heuvel, J., see Broersma, H.J.	122	(1993)	37- 49
van Trung, T., Some existence theorems for $t$ -designs	128	(1994)	337-348
Varadarajan, K., see Sankaran, P.	126	(1994)	313-323
Veldman, H.J., On dominating and spanning circuits in graphs	124	(1994)	229-239
Veldman, H.J., see Broersma, H.J.	121	(1993)	25- 35
Veldman, H.J., see Broersma, H.J.	122	(1993)	37- 49
Vestergaard, P.D., Two-cacti with minimum number of spanning trees	124	(1994)	241-250
Virlouvet, C., see Peroche, B.	125	(1994)	289-299
Vowden, B., Infinite series of double Youden rectangles	125	(1994)	385-391
Vu Dinh, H., On the length of longest dominating cycles in graphs	121	(1993)	211-222
Wagner, C., see Davis, R.	128	(1994)	95-111
Wan, Z., Anzahl theorems in finite singular symplectic, unitary and orthogonal geometries	123	(1993)	131-150

- Wan, Z., see Dai, Z. 123 (1993) 17-34
- Wang, C., On the  $R$ -sequenceability of dicyclic groups 125 (1994) 393-398
- Wang, H., On  $K_{1,1}$ -factorizations of a complete bipartite graph 126 (1994) 359-364
- Wang, L. and S. Stueckle, Symmetries of drawings of sets of cycles and chromatic automorphisms 128 (1994) 361-369
- Warnke, I., see Labahn, R. 126 (1994) 421-424
- Watkins, M.E., Sur les graphes infinis possédant un groupe d'automorphismes primitif 130 (1994) 177-182
- Wei, B., Hamiltonian paths and hamiltonian connectivity in graphs 121 (1993) 223-228
- Wei, W.-D. and J.-Y. Xu, Cycle index of direct product of permutation groups and number of equivalence classes of subsets of  $Z_n$  123 (1993) 179-188
- Wei, W.-D., S. Gao and B. Yang, Cyclic near difference sets of type 1 123 (1993) 151-177
- Welsh, D.J.A., The computational complexity of knot and matroid polynomials 124 (1994) 251-269
- White, A.T., Treble dodging minor methods: ringing the cosets, on six bells 122 (1993) 307-323
- Whitehead, C., see Finbow, A. 125 (1994) 153-167
- Whitehead Jr, E.G., see Li, N.-Z. 122 (1993) 365-372
- Wild, P., see Jedwab, J. 125 (1994) 241-254
- Wojda, A.P., see Fouquet, J.L. 121 (1993) 85-92
- Woźniak, M., A note on minimal order of a bipartite graph with exactly  $q$  quadrilaterals 121 (1993) 229-233
- Xu, J.-Y., see Wei, W.-D. 123 (1993) 179-188
- Xu, M.-Y., Vertex-primitive digraphs of prime-power order are hamiltonian (*Note*) 128 (1994) 415-417
- Yang, B., see Wei, W.-D. 123 (1993) 151-177
- Yang, X. and J.L. Massey, The condition for a cyclic code to have a complementary dual (*Communication*) 126 (1994) 391-393
- Yang, Y. and P. Rowlinson, The third Ramsey numbers for graphs with at most four edges 125 (1994) 399-406
- Yeh, Y.-N., see Ivashchenko, A.V. 126 (1994) 171-178
- Yeh, Y.-N., see Sagan, B.E. 126 (1994) 293-311
- Youngs, D., see Hanson, D. 122 (1993) 353-355
- Yu, M., On path factorizations of complete multipartite graphs 122 (1993) 325-333
- Yu, S.S., see Shyr, H.J. 126 (1994) 339-348
- Yu, X., see Hell, P. 127 (1994) 213-220

- Zaslavsky, T., see Solé, P. 128 (1994) 401-405
- Zemor, G., A generalisation to noncommutative groups of  
a theorem of Mann 126 (1994) 365-372
- Zhang, G.-H., Pseudo-one-factorizations of regular graphs  
of odd order — II. Products of graphs 128 (1994) 371-384
- Zhao, S.-Y., see Ting, S.-T. 123 (1993) 117-120
- Zheng, M., see Hansen, P. 122 (1993) 179-196
- Zhou, H., see Hell, P. 127 (1994) 213-220
- Zhu, L., Some recent developments on BIBDs and related  
designs 123 (1993) 189-214
- Ziegler, G.M., see Sagan, B.E. 126 (1994) 293-311
- Zito, J., see Dean, N. 126 (1994) 67- 80
- Znám, S., see Rosa, A. 128 (1994) 305-316
- Żurawiecki, J., Universal circuit matrix for adjacency  
graphs of feedback functions (*Note*) 126 (1994) 441-445





# COMPUTATIONAL GEOMETRY

## Theory and Applications

### Editors-in-Chief:

**J.-R. Sack**, *School of Computer Science, Carleton University, Ottawa, Ontario, Canada K1S 5B6*, and

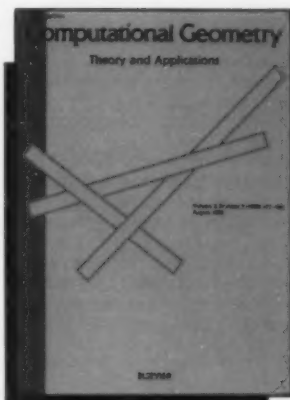
**J. Urrutia**, *Department of Computer Science, University of Ottawa, Ottawa, Ontario, Canada K1N 6N5*

Honorary Editors: **P. Erdős** and **F.P. Preparata**

### AIMS AND SCOPE

**Computational Geometry** is a forum for research in theoretical and applied aspects of computational geometry. The journal publishes fundamental research in all areas of the subject, as well as disseminating information on the applications, techniques, and use of computational geometry.

**Computational Geometry** publishes articles on the design and analysis of geometric algorithms. All aspects of computational geometry are covered, including the numerical, graph theoretical and combinatorial aspects. Also welcomed are computational geometry solutions to fundamental problems arising in computer graphics, pattern recognition, robotics, image processing, CAD-CAM, VLSI design and geographical information systems.



### Computational Geometry

features a special section containing open problems and concise reports on implementations of computational geometry tools.

### ABSTRACTED/INDEXED IN:

ACM Computing Reviews, Cambridge Scientific Abstracts, Computer Abstracts, Engineering Index/Compendex, Geo Abstracts, INSPEC Information Services, International Abstracts in Operations Research, Mathematical Reviews, Zentralblatt für Mathematik.

1994 Volume 4 (in 6 issues)  
Dfl. 348.00 (US \$ 188.00)  
incl. postage  
ISSN 0925-7721

*Dutch Guilder prices quoted apply worldwide, except in the Americas (North, Central and South America). US \$ prices quoted apply in the Americas only. Customers in the European Community should add the appropriate VAT rate applicable in their country to the price.*



**ELSEVIER  
SCIENCE**  
B.V.

Send this form (or a photocopy) to:  
**ELSEVIER SCIENCE B.V.**  
attn: Marijke Haccou  
P.O. Box 103  
1000 AC Amsterdam  
The Netherlands

*In the USA/Canada:*  
attn: Judy Weislogel  
P.O. Box 945  
Madison Square Station  
New York, NY 10160-0757

### COMPUTATIONAL GEOMETRY

Please send an inspection copy of this journal to:

Name \_\_\_\_\_

Address \_\_\_\_\_

Country \_\_\_\_\_

# Advanced Theories of Hypoid Gears

By X.C. Wang and S.K. Ghosh

Studies in Applied Mechanics Volume 36

In order to develop more efficient types of gears, further investigation into the theories of engagement is necessary. Up until now most of the research work on the theories of engagement has been carried out separately on different groups, and based on individual types of profiles. This book aims at developing some universal theories, which can not only be used for all types of gears, but can also be utilized in other fields such as sculptured surfaces.

The book has four characteristics: the investigations are concentrated on mismatched tooth surfaces; all the problems are dealt with from a differential geometry point of view; most theories and algorithms are universal in application; and the algorithms are easy to follow and can be used in real situations. In the process of developing the algorithms, the authors have introduced some mathematical methods which are believed to be innovative with regard to the theories of engagement known so far. A theoretical treatment is presented throughout the book, supported by numerical examples and experiments. With the computer programs listed at the end of the volume, any of the proposed methods can be easily utilized in practice.

The book is intended for postgraduate students, lecturers, professors, or research staff in mechanical/manufacturing engineering, mathematics and R & D departments of research institutes and universities. It will also be useful for engineers working in the gear manufacturing sector of

industry.

**Contents:** Preface. **Analysis of Combined Mismatched Tooth Surfaces Up To and Including Third Order Contact.** Introduction. Establishment of moving frames. Differential forms of moving frames. Restricting conditions for contact. Second order contact analysis. Third order contact analysis. Example calculation. Conclusion. **A Direct Method for Calculating Geometric Parameters of Tooth Surfaces Up To and Including Third Order.** Introduction. The curvature tensor of a surface. Geometric parameters of the generating flank. Second order geometric parameters. Third order geometric parameters. Example calculation. Conclusion. **Analysis of Rates of Change of Contact Situations of a Gear Pair under Vertical (V) and Horizontal (H) Check.** Introduction. The longitudinal direction and geodetic curvature of longitudinal line. The rates of movement in V and H directions. The rates of change of the second order contact situations. Example calculation and experimental results. Conclusion. **A Direct Method for Determining the Parameters of Mating Tooth Surfaces according to Predetermined Contact Situations.** Introduction. The basic formulae of point-contact tooth surfaces. Situation of predetermining contact parameters on known surface. Situation of predetermining contact parameters on unknown surface. Example calculation. Conclusion. **A Simple Method of Obtaining Machine-Setting**

**Parameters for Spiral Bevel and Hypoid Gears.** Introduction. The machine root angle and forming position of reference point. The difference surface and generating flank. Machine setting parameters for generators with neither modified-roll nor workhead-vertical-feed mechanism. Machine setting parameters for generators with modified-roll mechanism. Machine setting parameters for allcone method. Example calculation. Conclusion. **An Optical Synthesis of Spiral Bevel and Hypoid Gears.** Introduction. The reference point on generating and gear tooth flank. The objective function for optimal synthesis. Optimal synthesis process. Reasonable presetting of contact parameters. Conclusion. **Analysis of Error Sensitivity of the Contact Situations with Respect to Mounting Errors.** Introduction. Mounting error vector of a gear pair. Error sensitivity matrix of the position of tooth bearing centre. Error sensitivity matrix of second-order contact parameters. The background of application. The relationship between error sensitivity matrices and vertical (V) and horizontal (H) check results. Numerical example. Conclusions. **References.** **Appendices.** Subroutines. Main program for machines with cutter-tilt mechanism. Main program for machines with modified-roll mechanism. Numerical example. User's guide for appendices 2 and 3.

©1994 256 pages (with diskette)  
Hardbound  
Price: Dfl. 325.00 (US\$185.75)  
ISBN 0-444-81705-0

Elsevier Science B.V.  
Attn: Chris Ryan  
P.O. Box 1991  
1000 BZ Amsterdam  
The Netherlands

in the USA/Canada:  
Attn: Judy Weislogel  
P.O. Box 945  
Madison Square Station  
New York, NY 10160-0757

The Dutch Guilder (Dfl.) price quoted applies worldwide. US Dollar (US\$) price quoted may be subject to exchange rate fluctuations.



ELSEVIER  
SCIENCE B.V.

## Scope of the Journal

The aim of this journal is to bring together research papers in different areas of discrete mathematics. Contributions presented to the journal can be research papers, short notes, surveys, and possibly research problems. The 'Communications' section will be devoted to the fastest possible publication of the brief outlines of recent research results, the detailed presentation of which might be submitted for possible publication in DISC or elsewhere. The journal will also publish a limited number of book announcements, as well as proceedings of conferences. The journal will publish papers in combinatorial mathematics and related areas. In particular, graph and hypergraph theory, network theory, coding theory, block designs, lattice theory, the theory of partially ordered sets, combinatorial geometries, matroid theory, extremal set theory, logic and automata, matrices, polyhedra, discrete probability theory, etc. shall be among the fields covered by the journal.

## Instructions to contributors

All contributions should be written in English or French, should have an abstract in English (as well as one in French if the paper is written in French), and—with the exception of Communications—should be sent in triplicate to Nelly Segal, Editorial Manager, RUTCOR, Rutgers University Center for Operations Research, P.O. Box 5062, New Brunswick, NJ 08903-5062, USA. The authors are requested to put their mailing address on the manuscript.

Upon acceptance of an article, the author(s) will be asked to transfer copyright of the article to the Publisher. This transfer will ensure the widest possible dissemination of information.

Manuscripts submitted for the Communications section, having at most 5 typewritten pages, should be sent to a member of the editorial board in triplicate. Detailed proofs do not have to be included, but results must be accompanied at least by rough outlines of their proofs. Subsequent publication in this journal or elsewhere of the full text of a research report, the outline of which has been published in the Communications section of our journal, is not excluded. Every effort shall be made for the fastest possible publication of Communications. Therefore all proofreading will be done by the Publisher's staff and no proofs will be sent to authors. Consequently the presentation of these manuscripts should be very clear. No page charge is made.

Please make sure that the paper is submitted in its final form. Corrections in the proofstage, other than of printer's errors, should be avoided; costs arising from such extra corrections will be charged to the authors. The manuscript should be prepared for publication in accordance with instructions given in the 'Instructions to Authors' (available from the Publisher) details of which are condensed below:

1. The manuscript must be typed on one side of the paper in double spacing with wide margins. A duplicate copy should be retained by the author.
2. All mathematical symbols which are not typewritten should be listed separately.
3. Footnotes, which should be kept to a minimum and should be brief, must be numbered consecutively and typed on a separate sheet in the same format as the main text.
4. Special care should be given to the preparation of the drawings for figures and diagrams. Except for a reduction in size, they will appear in the final printing in exactly the same form as they were submitted by the author; normally they will not be redrawn by the printer. In order to make a photographic reproduction possible, all drawings should be on separate sheets, with wide margins, drawn large size, in Indian ink, and carefully lettered. Exceptions are diagrams only containing formulae and a small number of single straight lines (or arrows); these can be typeset by the printer.
5. References should be listed alphabetically, in the same way as the following examples:  
*For a book:* W.K. Chen, *Applied Graph Theory* (North-Holland, Amsterdam, 1971).  
*For a paper in a journal:* J. Rhodes and B.R. Tilson, Lower bounds for complexity of finite semigroups, *J. Pure Appl. Algebra* 1 (1971) 79–95.  
*For a paper in a contributed volume:* M.O. Rabin, Weakly definable relations and special automata, in: Y. Bar-Hillel, ed., *Mathematical Logic and Foundations of Set Theory* (North-Holland, Amsterdam, 1970) 1–23.  
*For an unpublished paper:* D. Allen, Relations between the local and global structure of finite semigroups, Ph.D. Thesis, University of California, Berkeley, CA, 1968.

## Author's benefits

1. 30% discount on all book publications of North-Holland.
2. 50 reprints are provided free of charge to the principal author of each paper published.

*US mailing notice*—*Discrete Mathematics* (0012-365x) is published monthly with one additional issue in January (total 13 issues) by Elsevier Science (Molenwerf 1, Postbus 211, 1000 AE Amsterdam). Annual subscription price in the USA US\$ 2185.00 (US\$ price valid in North, Central and South America only), including air speed delivery. Application to mail at second class postage rate is pending at Jamaica, NY 11431.

**USA POSTMASTERS:** Send address changes to *Discrete Mathematics*, Publication Expediting, Inc., 200 Meacham Avenue, Elmont, NY 11003. Air freight and mailing in the USA by Publication Expediting.



0012-365X(1994)121/130;1-9

